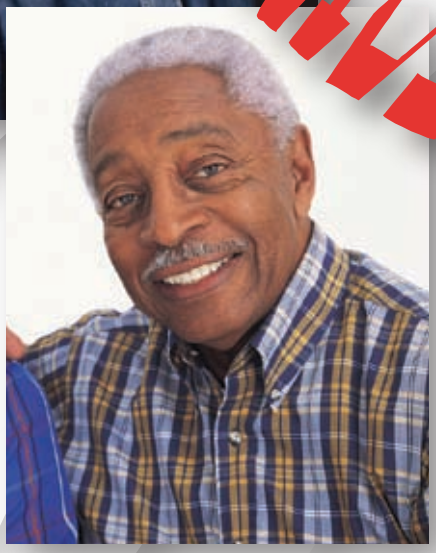

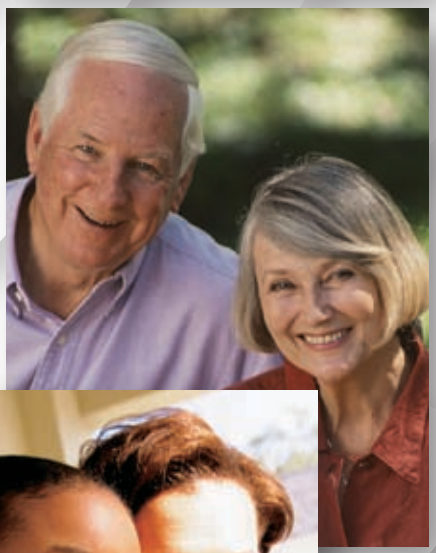

Wisconsin Heart Disease and Stroke Surveillance Summary Update

January 2007

Wisconsin Cardiovascular Health Program
Wisconsin Department of Health and Family Services
Division of Public Health
Bureau of Community Health Promotion

Introduction

Cardiovascular disease (CVD) is the leading cause of death and disability in the United States and in Wisconsin. CVD is a major public health concern and economic cost for the people of Wisconsin.

CVD is defined as all diseases of the heart and blood vessels and includes coronary (ischemic) heart disease, stroke (cerebrovascular disease), congestive heart failure, hypertensive disease and atherosclerosis. Despite three decades of declining CVD death rates, cardiovascular disease remains the leading cause of death for men and women in the United States and in Wisconsin.

According to data from the Department of Health and Family Services (DHFS), Division of Public Health (DPH), Bureau of Health Information and Policy (BHIP), in 2004, 35% of all Wisconsin deaths (16,087) were due to cardiovascular disease. This includes 7,671 deaths due to coronary heart disease and 3,064 to stroke. In addition, there were almost 96,000 hospitalizations for cardiovascular disease in Wisconsin, accounting for over $2.5 billion in associated charges.

Deaths and disability from cardiovascular disease are influenced by modifiable risk factors such as tobacco use, physical inactivity, high blood pressure, high cholesterol, poor nutrition, and related conditions such as diabetes, overweight, and obesity. Because it is the leading cause of death and many of the risk factors are well documented and preventable, cardiovascular disease is currently a public health priority in Wisconsin and the United States. By creating environments that support or encourage healthier lifestyles, people in Wisconsin could reduce much of the burden and disability from cardiovascular disease.

The Cardiovascular Health Program (CVHP), Bureau of Community Health Promotion (BCHP), Wisconsin Division of Public Health produced this report with the guidance of statewide cardiovascular partners. This independent advisory group was comprised of epidemiologists, practitioners, advocates and others from organizations throughout the state (see acknowledgements).

The purpose of this report is to present the current status in Wisconsin of cardiovascular disease and mortality, CVD hospitalizations with an estimate of associated charges, and the prevalence of CVD risk factors. The emphasis of the report will be on coronary heart disease and stroke.

Comments, suggestions, and requests for additional information may be addressed to:

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Executive Summary

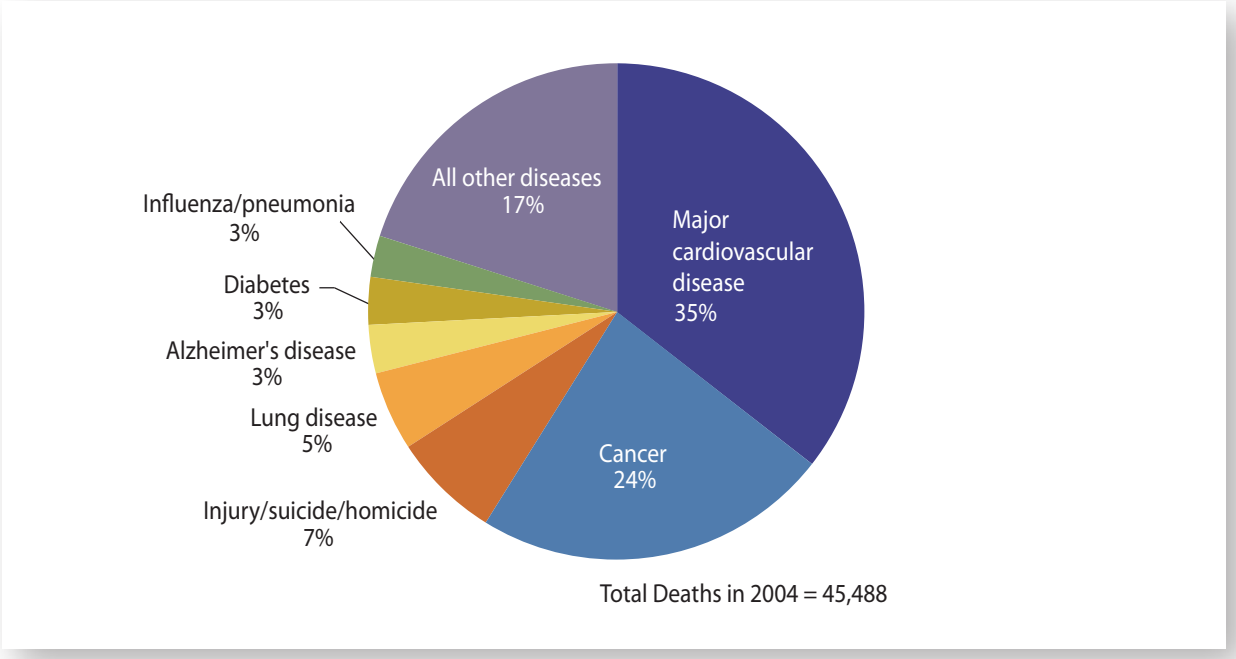
Unless otherwise stated, all data are from 2004.

- Coronary (ischemic) heart disease (CHD) accounted for 7,671 of Wisconsin deaths and cerebrovascular disease (stroke) for 3,064.
- Cardiovascular disease (CVD), including heart disease and stroke, is consistently the leading cause of mortality of Wisconsin residents, accounting for over 16,000 deaths or 35% of all deaths in Wisconsin.
- Although death rates for CHD and stroke have declined in Wisconsin and the United States, these diseases remain the first and third leading causes of death respectively. In 2002, Wisconsin ranked 20th in the nation for CHD deaths and 27th for stroke mortality. (A rank of 1 represents the lowest, or best, mortality rate.)
- CVD is not just a disease of old age; overall, 22% of male and 7% of female coronary heart disease deaths were in persons less than 65 years old for the years 2001-2004.
- For the years 2001-2004, the percentage of deaths before age 65 years from coronary heart disease was even higher for blacks or African Americans - 50% for blacks or African American males and 30% for blacks or African American females.
- Thirty-one percent (31%) of coronary heart disease deaths and 21% of stroke deaths occurred before age 75 for the years 2001-2004.
- Almost 96,000 hospitalizations or 16% of all hospitalizations in Wisconsin were related to cardiac diagnoses.
- Cardiovascular-related hospitalization charges amounted to more than $2.5 billion.
- We use body mass index (BMI), defined as Kg/m^2, to measure overweight and obesity which are known risk factors for CVD mortality and morbidity. In 2005, more than half (58%) of Wisconsin adults were either overweight ($25 \leq BMI < 30$) or obese ($BMI \geq 30$).
- About one in five Wisconsin adults smoke; this rate has remained fairly constant from 1990 to 2004 (Approximately 23%), despite public awareness of the detrimental effects of smoking.
- Lack of physical activity is a significant risk factor for CVD; only 57% of Wisconsin adults fulfilled the recommended amount of 30 minutes or more of moderate physical activity on most days of the week.
- Many health risk behavior patterns are established in youth. In 2005, 21% of high school students smoked cigarettes and 24% were overweight or at risk for being overweight.

Mortality (Deaths)

Cardiovascular disease, including heart disease and stroke, was the leading cause of death (16,087 deaths) among Wisconsin residents in 2004, accounting for almost 35% of all deaths.[1]

Figure 1:
Leading Underlying Causes of Death, Wisconsin, 2004*



Source: Wisconsin Deaths 2004, Bureau of Health Information and Policy, DPH, Wisconsin Department of Health and Family Services

* The total percentage may not be summed up to 100% due to rounding for individual causes.

- In 2004 there were more deaths in Wisconsin from cardiovascular disease than from cancer, automobile crashes, suicide, homicide, and AIDS combined.

Mortality (Deaths) continued

Major cardiovascular disease (CVD), which accounted for more than 35% of all resident deaths in Wisconsin (Figure 1), is comprised of several categories of diseases. Table 1 shows the categories included in major CVD, with the number of deaths in each category and the percentage of the total deaths in the category. Major CVD includes diseases of the heart, primary hypertension, stroke, atherosclerosis and other diseases of the circulatory system. Diseases of the heart are further broken down into coronary (ischemic) heart disease, hypertensive heart disease, congestive heart failure and other diseases of the heart.

Table 1:
Major Cardiovascular Disease (CVD) Deaths, by Category, Wisconsin, 2004

Disease Category	Number of Deaths		% of CVD Deaths
Major Cardiovascular Disease		**16,087**	**100%**
Diseases of the Heart		11,883	73.9%
Coronary (Ischemic) Heart Disease	*7,671*		*47.7%**
Hypertensive Heart Disease	*508*		*3.2%**
Congestive Heart Failure	*1,472*		*9.2%**
Other Diseases of the Heart	*2,232*		*13.8%**
Primary Hypertension/Hypertensive Renal Disease		370	2.3%
Cerebrovascular Disease (Stroke)		3,064	19.0%
Atherosclerosis		194	1.2%
Other Diseases of the Circulatory System		576	3.6%

Source: Wisconsin Deaths 2004, Bureau of Health Information and Policy, DPH, Wisconsin Department of Health and Family Services

* Included in the category "Diseases of the Heart"

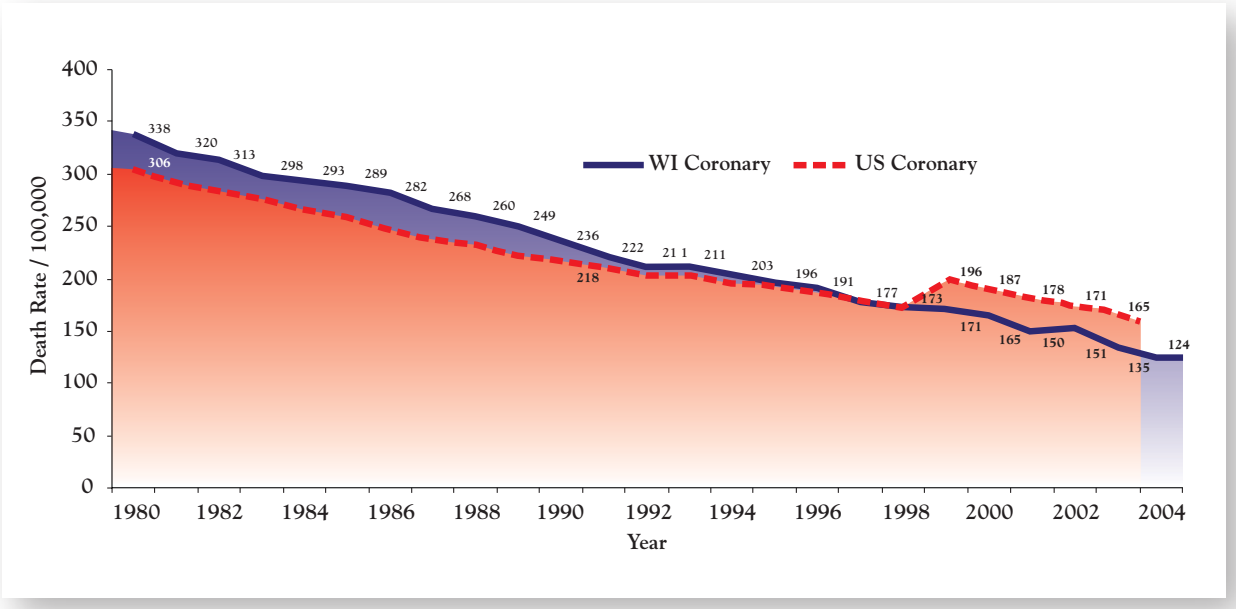
- The Disease of the Heart category accounted for 11,883 of Wisconsin resident deaths in 2004. This included 7,671 deaths for coronary (ischemic) heart disease, which accounted for nearly 48% of major CVD deaths or 17% of all Wisconsin deaths. Congestive heart failure, also in this category, accounted for 1,472 Wisconsin resident deaths in 2004.
- Cerebrovascular disease, or stroke, accounted for 3,064 deaths or 19% of major CVD deaths or 7% of all Wisconsin deaths. Stroke is the third leading cause of death among all Wisconsin resident deaths.

Mortality (Deaths) continued

Although death rates from cardiovascular disease (CVD) have declined since 1980, it still remains the leading cause of death in Wisconsin and the nation.[2] This section demonstrates trends in coronary heart disease, congestive heart failure, and stroke mortality rates in Wisconsin and the United States since 1980.

In 2002 (the most recent national data), Wisconsin ranked 20th in coronary heart disease mortality (1st being the lowest, or best, mortality rate and 52nd being the highest or worst).[2]

Figure 2:
Age-Adjusted Mortality Rates* for Coronary Heart Disease, Wisconsin, 1980-2004 and the United States, 1980-2003**



Source: Wisconsin Deaths, Bureau of Health Information and Policy, DPH, Wisconsin Department of Health and Family Services & American Heart Association (AHA), Biostatistics Consultant, National Center, Dallas, TX

* Data labels are shown for all Wisconsin rates, but for only 1980, 1990, and 1999 and subsequent years for US rates.

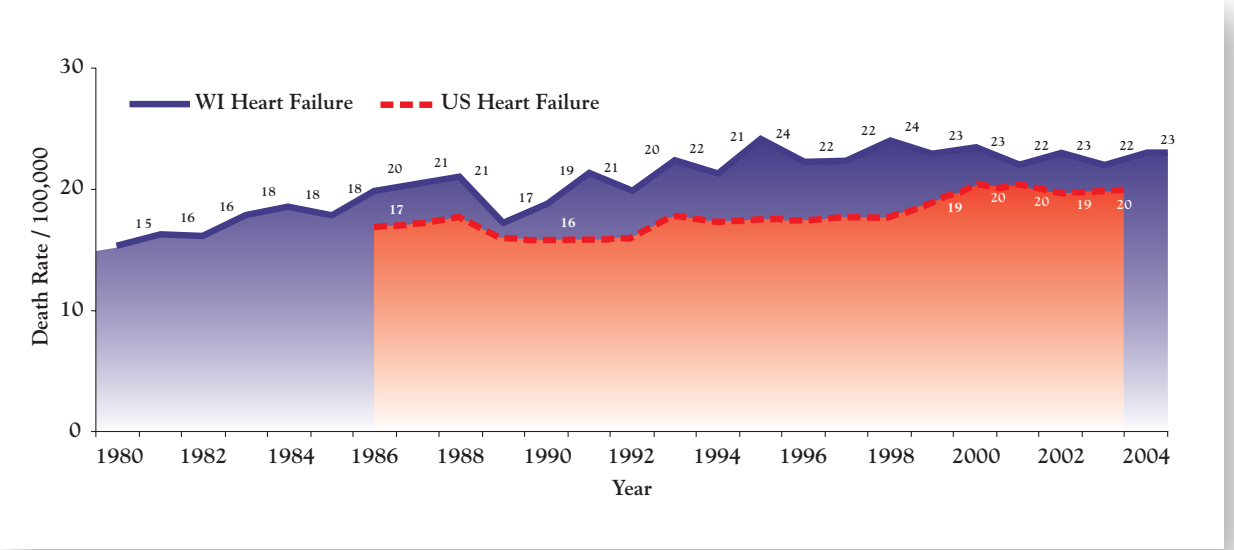
** Wisconsin data (ICD-9: 410-414, 429.2; ICD-10: I20-I25) were computed by the Wisconsin Bureau of Health Information and the national data by the American Heart Association (ICD-9: 410-414; ICD-10: I20-I25). All rates are age-adjusted to the US 2000 Standard Population and expressed in deaths/100,000 population (see Technical Notes).

- Coronary heart disease (CHD) is the major category in CVD; the death rate in 2004 for CHD in Wisconsin was 124 deaths/100,000 population. There was a 63% decline from the rate in 1980 of 338 deaths/100,000 population. This Wisconsin rate has been lower than the national average since 1998.

Mortality (Deaths) continued

Deaths from congestive heart failure are increasing in Wisconsin and nationally.[2] The American Heart Association estimates that about 22% of men and 46% of women who survive a heart attack will be disabled from congestive heart failure within six years.[2]

Figure 3:
Age-Adjusted Mortality Rates* for Congestive Heart Failure, Wisconsin, 1980-2004 and the United States, 1986-2003**



Source: Wisconsin Deaths, Bureau of Health Information and Policy, DPH, Wisconsin Department of Health and Family Services & American Heart Association (AHA), Biostatistics Consultant, National Center, Dallas, TX

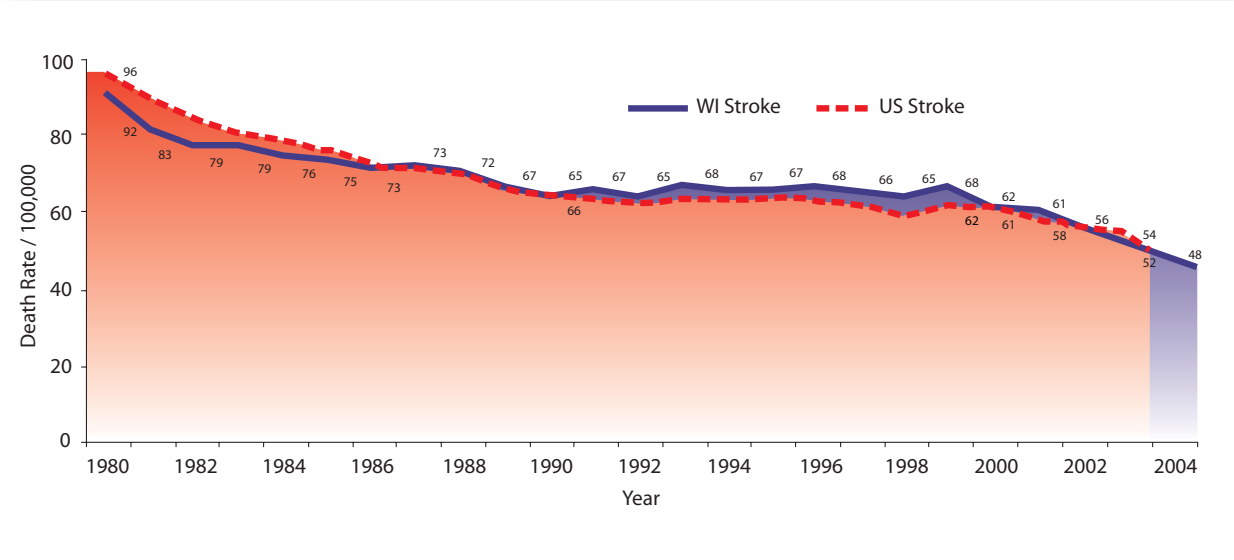
* Data labels are shown for all Wisconsin rates, but for only 1986, 1990, and 1999 and subsequent years for US rates. 1986 was the first year US data was available from the American Heart Association.

** The Wisconsin data (ICD-9: 428; ICD-10: I50) were computed by the Wisconsin Bureau of Health Information and the national data by the American Heart Association (ICD-9: 428; ICD-10: I50). All rates are age-adjusted to the US 2000 Standard Population and expressed in deaths/100,000 population (see Technical Notes.)

- Unlike the trend for most cardiovascular disease, mortality rates for congestive heart failure have been increasing since 1980.
- From 1980-2004, Wisconsin mortality rates increased from 15 to 23 deaths/100,000, representing a 53% increase.
- Wisconsin had consistently higher rates from 1986-2003 when compared with the US.

Stroke is the leading cause of serious long-term disability in the United States. In 1999, there were more than 1.1 million adults who reported difficulty with functional limitations and activities of daily living resulting from stroke.[2]

Figure 4:
Age-Adjusted Mortality Rates* for Stroke,
Wisconsin, 1980-2004 and the United States, 1980-2003**



Source: Wisconsin Deaths, Bureau of Health Information and Policy, DPH, Wisconsin Department of Health and Family Services & American Heart Association (AHA), Biostatistics Consultant, National Center, Dallas, TX

* Data labels are shown for all Wisconsin rates, but for only 1980, 1990, and 1999 and subsequent years for US rates.

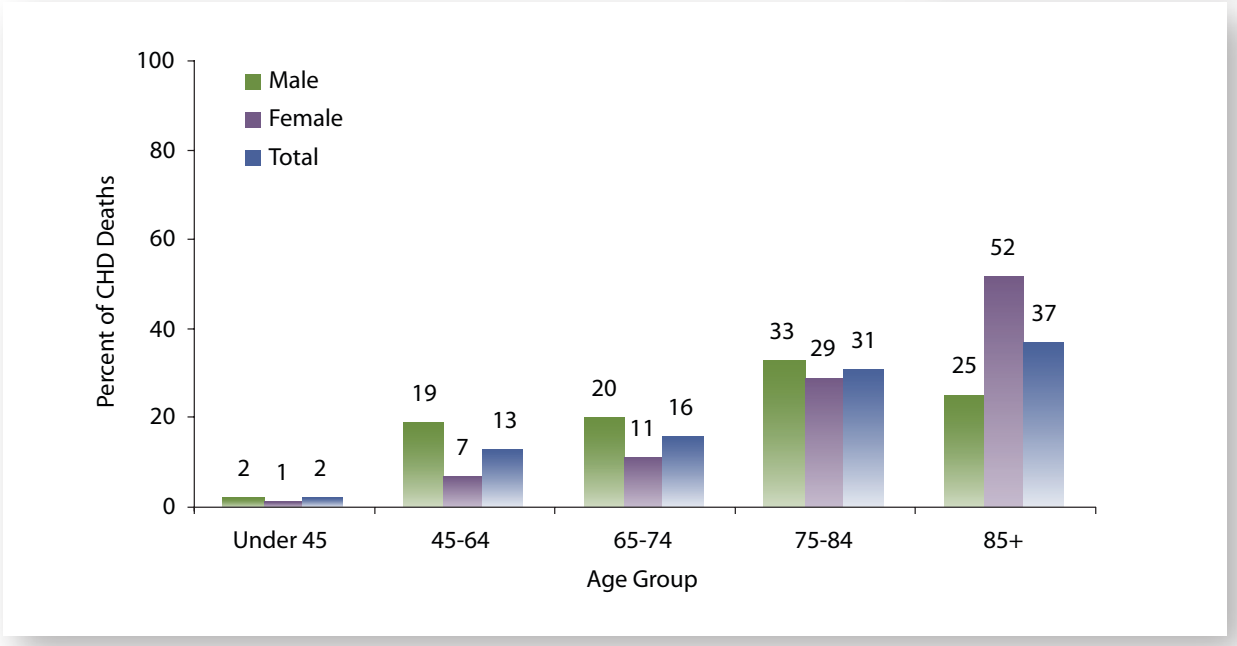
** The Wisconsin data (ICD-9: 430-438; ICD-10: I60-69) were computed by the Wisconsin Bureau of Health Information and the national data by the American Heart Association (ICD-9: 430-438; ICD-10: I60-69). All rates are age-adjusted to the US 2000 Standard Population and expressed in deaths/100,000 population (see Technical Notes).

- The stroke mortality rate declined 48% in Wisconsin from 1980-2004 and 44% nationally from 1980-2003.
- Since 1986, the stroke mortality rate in Wisconsin has been greater or equal to the US mortality rate, however, since 2002, this trend has reversed.
- In 2002, Wisconsin ranked 27th in stroke deaths (1st being the lowest, or best, mortality rate and 52nd the highest).[2]

Mortality (Deaths) continued

Figures 5 and 6 show the percentage of deaths from coronary heart disease and stroke by age group and sex, and Table 2 shows percentages of premature deaths by race. In Wisconsin, CHD accounted for 33,455 deaths from 2001-2004.

Figure 5:
Percentage of Coronary Heart Disease (CHD) Deaths, by Age Group and Sex, Wisconsin, 2001-2004

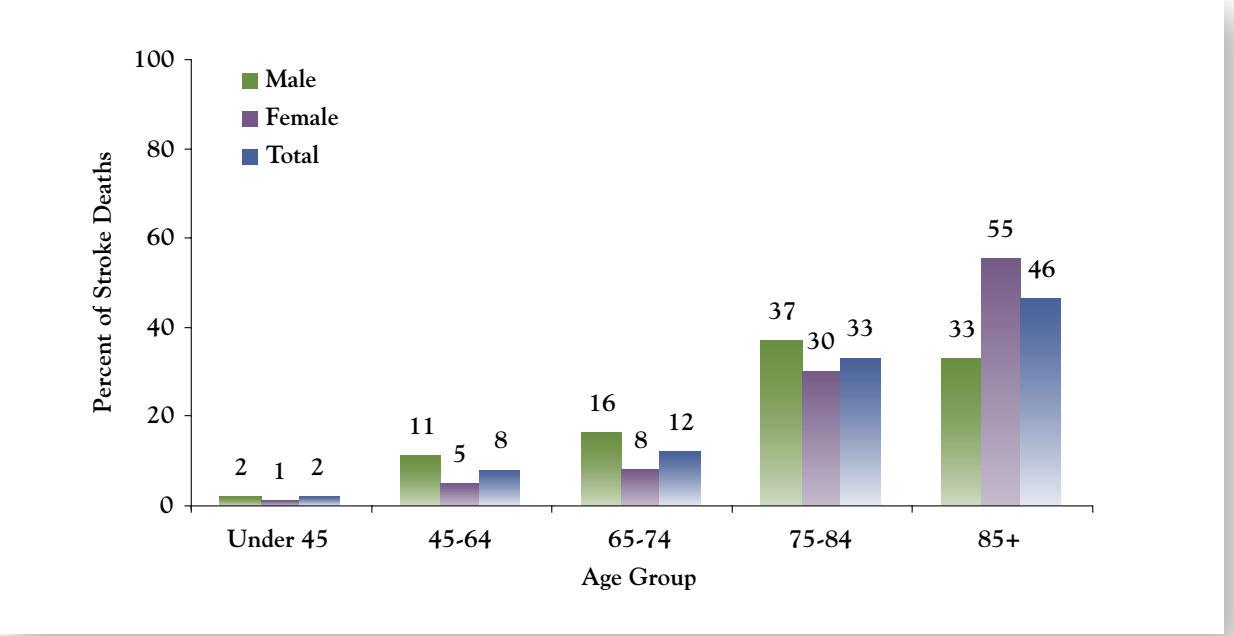


Source: Wisconsin Deaths 2001-2004, Bureau of Health Information and Policy, DPH, Wisconsin Department of Health and Family Services

- Twenty-two percent of males and 8% of females died from coronary heart disease before age 65 years.
- Forty-two percent of males and 19% of females died from coronary heart disease before age 75 years.
- More than half of women (52%), who died from coronary heart disease, died at age 85 years or older compared with only 25% of men who were 85 years or older.
- Almost one in three deaths (31%) from coronary heart disease were considered premature and occurred to people under age 75 years.

Stroke is the third leading cause of death in Wisconsin, accounting for 13,390 deaths from 2001-2004.

Figure 6:
Percentage of Stroke Deaths, by Age Group and Sex, Wisconsin, 2001-2004



Source: Wisconsin Deaths 2001-2004, Bureau of Health Information and Policy, DPH, Wisconsin Department of Health and Family Services

- Thirteen percent (13%) of males and 6% of females died from stroke before age 65 years and this percentage increases to a total of 29% of males and 14% of females died from stroke before age 75 years.
- More than half of women (55%), who died from stroke, died at age 85 years or older compared with 33% of men who died at age 85 years or older.
- One in five deaths (22%) from stroke are considered premature and occur to people under age 75 years.

Table 2:
Premature Coronary Heart Disease and Stroke Deaths, by Race and Sex, Wisconsin, 2001-2004

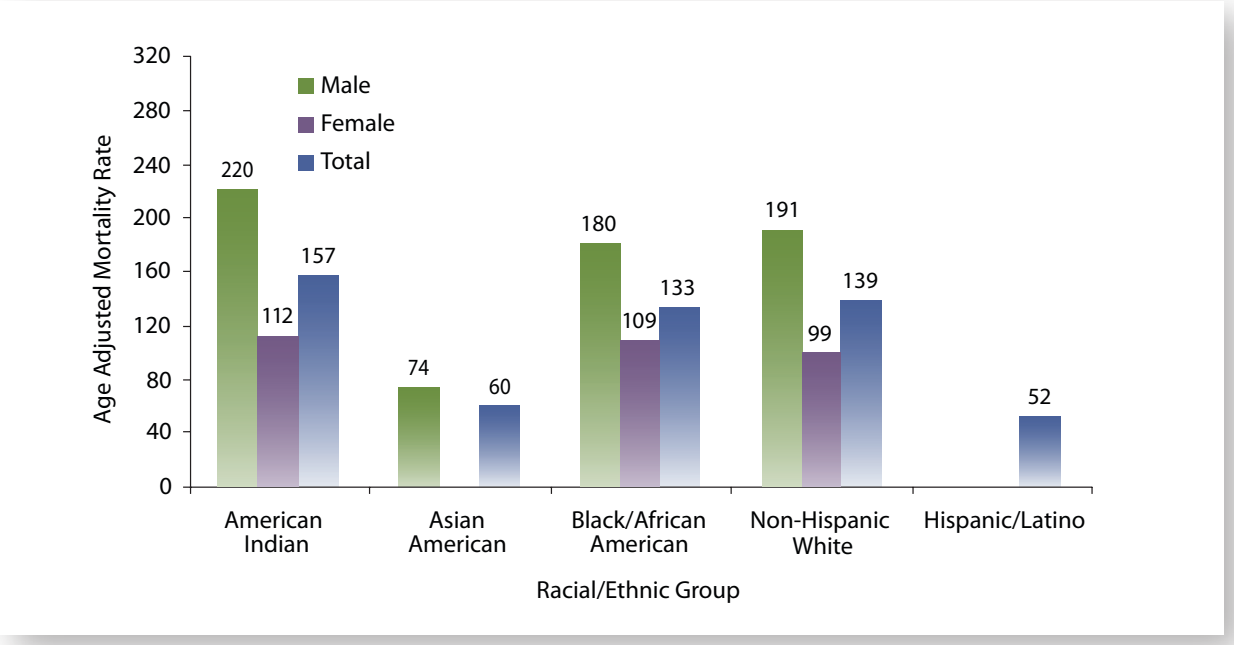
	% of Coronary Heart Disease Deaths		% of Stroke Death	
	Under 65 years	Under 75 years*	Under 65 years	Under 75 years*
Black Males	49.7%	73.2%	52.1%	74.7%
White Males	21.0%	41.1%	10.9%	27.0%
Black Females	29.6%	53.8%	31.4%	47.7%
White Females	9.2%	18.7%	5.8%	13.8%

* Includes deaths before 65 years of age

Source: Wisconsin Deaths 2001-2004, Bureau of Health Information and Policy, DPH, Wisconsin Department of Health and Family Services

- More blacks or African Americans died prematurely from coronary heart disease and stroke than whites for both males and females.
- Of those who died from coronary heart disease, 50% of blacks or African American men, 21% of white men, 30% of blacks or African American females, and 9% of white females died before the age of 65 years.
- Of those who died from stroke, 52% of blacks or African American men, 11% of white men, 31% of blacks or African American females, and 6% of white females died before the age of 65 years.
- Although dying before the age of 75 years is now considered premature death, there was a large disparity between blacks or African Americans and whites among those dying before the age of 65 years from CHD and stroke. There is also a marked disparity between blacks or African American women and white women dying prematurely from stroke.
- For both blacks or African Americans and whites, more men died prematurely than women for both coronary heart disease and stroke. The highest percentage of premature death was for coronary heart disease among blacks or African American men.

Figure 7:
Age-Adjusted Mortality Rates for Coronary (Ischemic) Heart Disease, by Race/Ethnicity and Sex, Wisconsin, 2001-2004

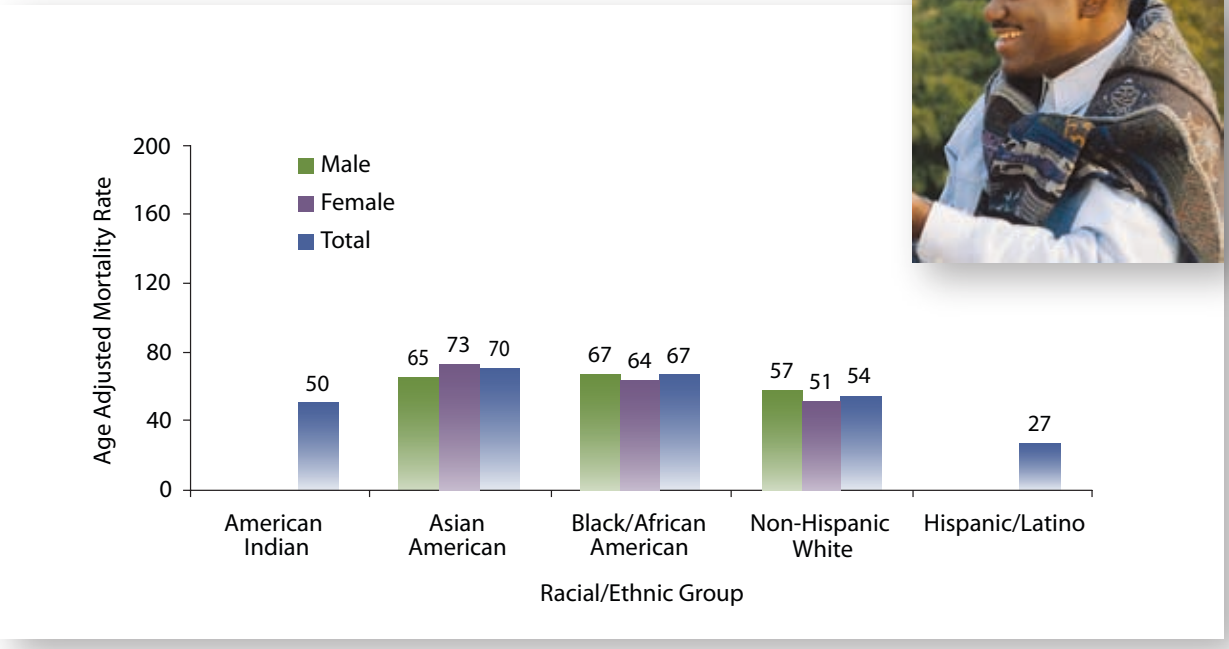


All rates are age-adjusted to the US 2000 Standard Population and expressed in deaths/100,000 population. Rates were not reported if there were less than 50 deaths for that subgroup in the 5-year period (see Technical Notes).

Source: Wisconsin Deaths 2001-2004, Bureau of Health Information and Policy, DPH, Wisconsin Department of Health and Family Services

- Coronary heart disease mortality rates in Wisconsin, as in the nation, differed by race/ethnicity and sex.
- In Wisconsin, the highest rate was among American Indian men, followed by white males, and then blacks or African American males. The rate in American Indian males was 22% higher than blacks or African American males and 15% higher than their non-Hispanic white counterparts.
- Rates were higher for males than females for every racial/ethnic group. Rates were almost double for males compared to females for American Indians, non-Hispanic whites (1.9 fold), and blacks or African Americans. Asian Americans were not comparable due to insufficient female data.
- Mortality rates for American Indians and blacks or African American females were 13% and 10% higher, respectively, in comparison to non-Hispanic white females.
- Rates were not reported by sex for Asian Americans, Hispanics/Latinos, and other races because there were fewer than 50 deaths in the four-year period.

Figure 8:
Age-Adjusted Mortality Rates for Stroke, by Race/Ethnicity and Sex, Wisconsin, 2001-2004



All rates are age-adjusted to the US 2000 Standard Population and expressed in deaths/100,000 population. Rates are not reported if there were less than 50 deaths for that subgroup in the 5-year period (see Technical Notes).

Source: Wisconsin Deaths 2001-2004, Bureau of Health Information and Policy, DPH, Wisconsin Department of Health and Family Services

- Mortality rates for stroke in Wisconsin differed by race and ethnicity.
- In Wisconsin, Asian Americans and Blacks or African Americans had higher stroke death rates, 31% for Asian Americans and 30% for blacks or African Americans respectively, than their non-Hispanic white counterparts.
- Rates were not reported by sex for American Indians, Hispanics/Latinos, and other races because there were fewer than 50 deaths in the four-year period.

Mortality (Deaths) by County

The following section illustrates the differences in coronary heart disease rates and stroke rates in Wisconsin counties.

This section includes a table and a map for coronary heart disease (Table 3 and Map 1) and stroke (Table 4 and Map 2). The tables report the annual average number of deaths and the age-adjusted rate for two time periods (1996-2000 and 2001-2004) for each county, with a final column showing the percent difference in the county rate for those two time periods. The maps demonstrate age-adjusted rates in Wisconsin counties by quartiles.

Summary findings:

Coronary Heart Disease:

- For the period 1996-2000, there was an average of 9,727 deaths/year, which translates to a statewide age-adjusted rate of 174.4/100,000 population.
- For coronary heart disease, for 2001-2004, there was an average of 8,364 deaths/year, which translates to a statewide age-adjusted rate of 138.9/100,000 population.
- The range of the age-adjusted coronary heart disease mortality rate among counties range from a low of 95.0 deaths/100,000 population to a high of 217.1 deaths/100,000 population.
- Mortality from coronary heart disease declined 20% from 1996-2000 to 2001-2004. A decline was seen in every county except one, ranging from 1% to 36%.

Stroke:

- For the period 1996-2000, there was an average of 3,686 deaths/year, which translates to a statewide age-adjusted rate of 65.1/100,000 population.
- For the period 2001-2004, there was an average of 3,348 deaths/year, which translates to a statewide age-adjusted rate of 54.6/100,000 population.
- The range of the age-adjusted stroke rates among counties range from a low of 35.6 deaths/100,000 population to 83.6 deaths/100,000 population.
- Statewide mortality from stroke declined 16% from 1996-2000 to 2001-2004. The difference for age-adjusted stroke rates was variable, ranging from a decline of 46% to an increase of 41%.

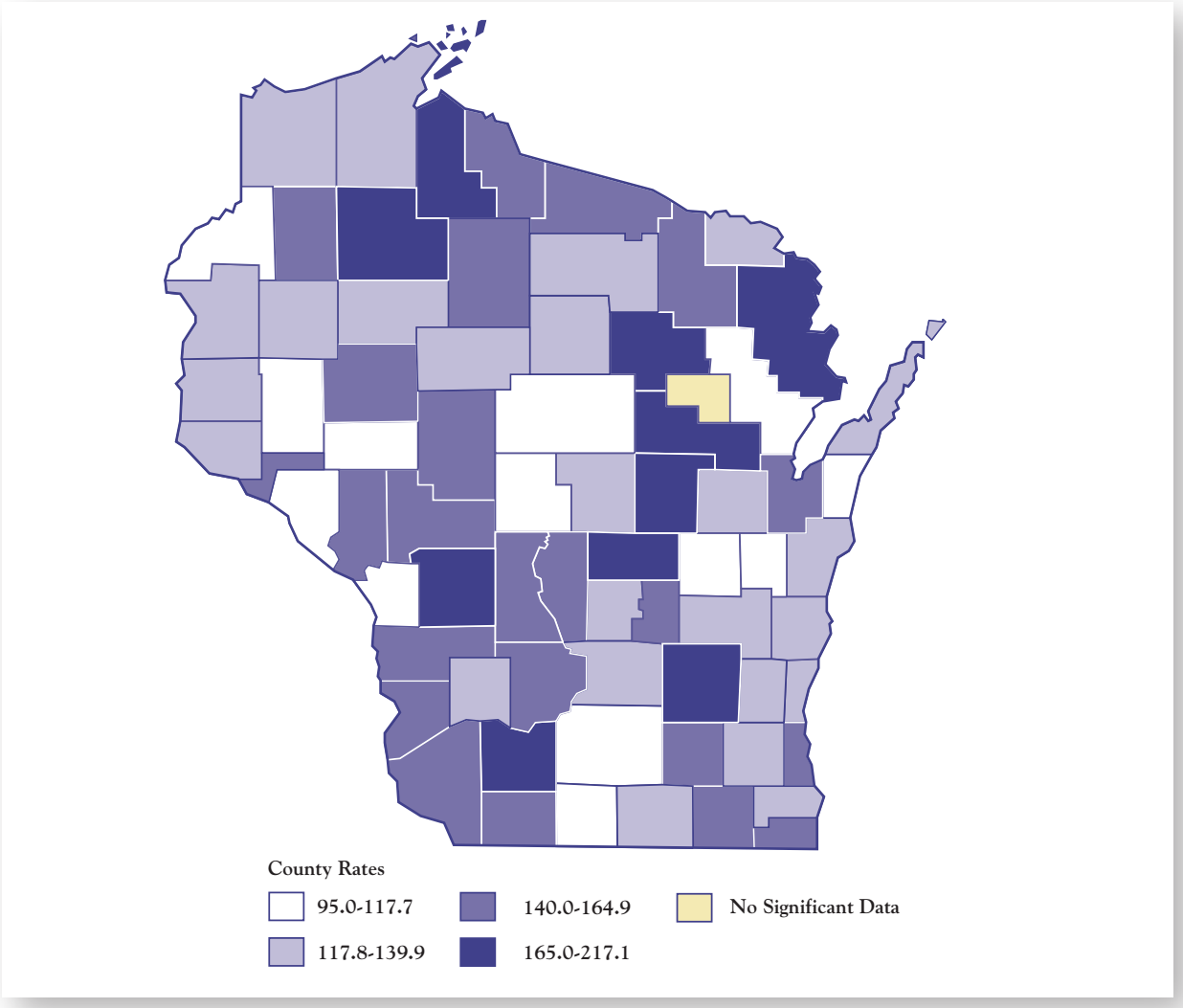
Table 3: Coronary Heart Disease Mortality Rates, by County, Wisconsin, 1996-2000 and 2001-2004

County	Annual Average No. Deaths 1996-2000	Annual Average No. Deaths 2001-2004	Age-Adj. Mortality Rate 1996-2000	Age-Adj. Mortality Rate 2001-2004	% Change in Age-Adj. Mortality Rate
Wisconsin Total	9,726.6	8,368.8	174.4	138.9	-20.4%
Adams	48.2	42.5	183.2	148.3	-19.1%
Ashland	45.6	45.5	205.5	199.2	-3.1%
Barron	113.4	88.5	194.5	138.4	-28.8%
Bayfield	31.2	26.8	152.8	134.9	-11.7%
Brown	355.0	314.8	177.8	145.8	-18.0%
Buffalo	25.8	21.5	141.3	115.4	-18.3%
Burnett	27.0	23.3	122.6	95.0	-22.5%
Calumet	44.2	41.3	120.1	108.6	-9.6%
Chippewa	122.0	101.0	185.8	144.5	-22.2%
Clark	76.4	65.0	171.8	147.0	-14.4%
Columbia	106.8	85.0	172.3	129.0	-25.1%
Crawford	38.0	34.8	169.8	152.4	-10.2%
Dane	441.4	399.5	137.4	109.5	-20.3%
Dodge	208.4	184.8	209.2	174.1	-16.8%
Door	60.4	54.3	159.6	123.7	-22.5%
Douglas	108.8	71.3	202.8	131.4	-35.2%
Dunn	57.2	45.3	154.3	113.0	-26.8%
Eau Claire	121.2	112.0	130.2	111.9	-14.0%
Florence	12.6	10.5	204.2	135.8	-33.5%
Fond du Lac	174.4	167.5	154.6	137.4	-11.1%
Forest	30.4	22.3	222.1	152.1	-31.5%
Grant	122.8	99.8	208.8	154.6	-26.0%
Green	65.6	43.8	159.5	102.3	-35.8%
Green Lake	52.6	44.8	168.7	148.6	-11.9%
Iowa	47.2	45.5	195.7	182.2	-6.9%
Iron	24.4	19.5	237.0	152.7	-35.6%
Jackson	53.0	39.0	228.5	164.9	-27.9%
Jefferson	135.0	118.5	183.2	147.5	-19.5%
Juneau	63.6	55.0	200.8	164.0	-18.3%
Kenosha	257.2	239.5	188.1	164.3	-12.7%
Kewaunee	34.2	25.8	135.0	97.1	-28.1%
La Crosse	160.8	135.3	148.4	117.7	-20.7%
Lafayette	39.0	31.3	199.2	150.7	-24.3%
Langlade	58.8	56.8	196.3	173.6	-11.5%
Lincoln	73.0	59.3	198.0	139.9	-29.4%
Manitowoc	186.4	136.5	171.7	125.8	-26.8%
Marathon	155.0	147.3	118.6	102.5	-13.6%
Marinette	148.2	114.3	232.7	176.6	-24.1%
Marquette	31.2	25.8	148.0	125.5	-15.2%
Menominee	5.4	5.3	*	*	*
Milwaukee	1870.4	1584.0	191.3	158.4	-17.2%
Monroe	90.0	88.5	210.5	181.8	-13.7%
Oconto	61.8	47.8	146.0	108.1	-26.0%
Oneida	82.8	70.5	168.4	130.3	-22.6%
Outagamie	231.6	191.3	158.7	124.2	-21.8%
Ozaukee	116.8	106.0	154.7	119.5	-22.7%
Pepin	19.4	16.0	165.4	144.8	-12.5%
Pierce	54.5	41.3	188.1	128.3	-31.8%
Polk	83.8	72.3	171.5	132.2	-22.9%
Portage	99.6	82.0	172.6	126.6	-26.7%
Price	44.8	39.3	168.4	158.8	-5.7%
Racine	313.2	256.3	170.3	131.5	-22.8%
Richland	42.4	32.5	163.1	128.5	-21.2%
Rock	271.4	218.5	172.9	134.0	-22.5%
Rusk	42.0	31.3	188.3	138.2	-26.6%
St Croix	96.0	74.5	188.7	120.9	-35.9%
Sauk	117.0	101.8	186.9	148.1	-20.8%
Sawyer	39.2	42.3	169.2	190.4	12.5%
Shawano	133.0	112.0	235.4	193.6	-17.8%
Sheboygan	183.6	187.0	139.3	137.8	-1.1%
Taylor	43.4	33.3	174.2	127.0	-27.1%
Trempealeau	74.6	61.8	184.8	154.8	-16.2%
Vernon	69.2	61.8	179.1	150.7	-15.9%
Vilas	62.2	54.5	185.5	153.3	-17.4%
Walworth	172.4	160.0	180.1	150.8	-16.3%
Washburn	47.8	35.5	222.3	146.9	-33.9%
Washington	163.4	146.0	161.5	123.6	-23.5%
Waukesha	566.8	490.5	191.3	128.0	-33.1%
Waupaca	150.0	143.3	214.0	188.2	-12.0%
Waushara	67.0	72.8	219.9	217.1	-1.3%
Winnebago	216.2	193.0	131.6	112.0	-14.9%
Wood	138.6	117.3	152.4	114.1	-25.1%

Annual average number of deaths calculated by dividing total deaths for the period (1996-2000 and 2001-2004) by five and four respectively.
All rates are age-adjusted to the US 2000 Standard Population and expressed in deaths/100,000 population (see Technical Notes).
* Rates and percent change are not reported if there were less than 50 deaths over the five-year or four-year period.
Percent change measures change from 1996-2000 to 2001-2004
Source: Wisconsin Deaths, Bureau of Health Information and Policy, DPH, Wisconsin Department of Health and Family Services

Map 1:
Age-Adjusted Coronary Heart Disease Mortality Rates, by County, Wisconsin, 2001-2004

Wisconsin rate: 138.9 deaths/100,000 population



Source: Wisconsin Deaths, Bureau of Health Information and Policy, DPH, Wisconsin Department of Health and Family Services

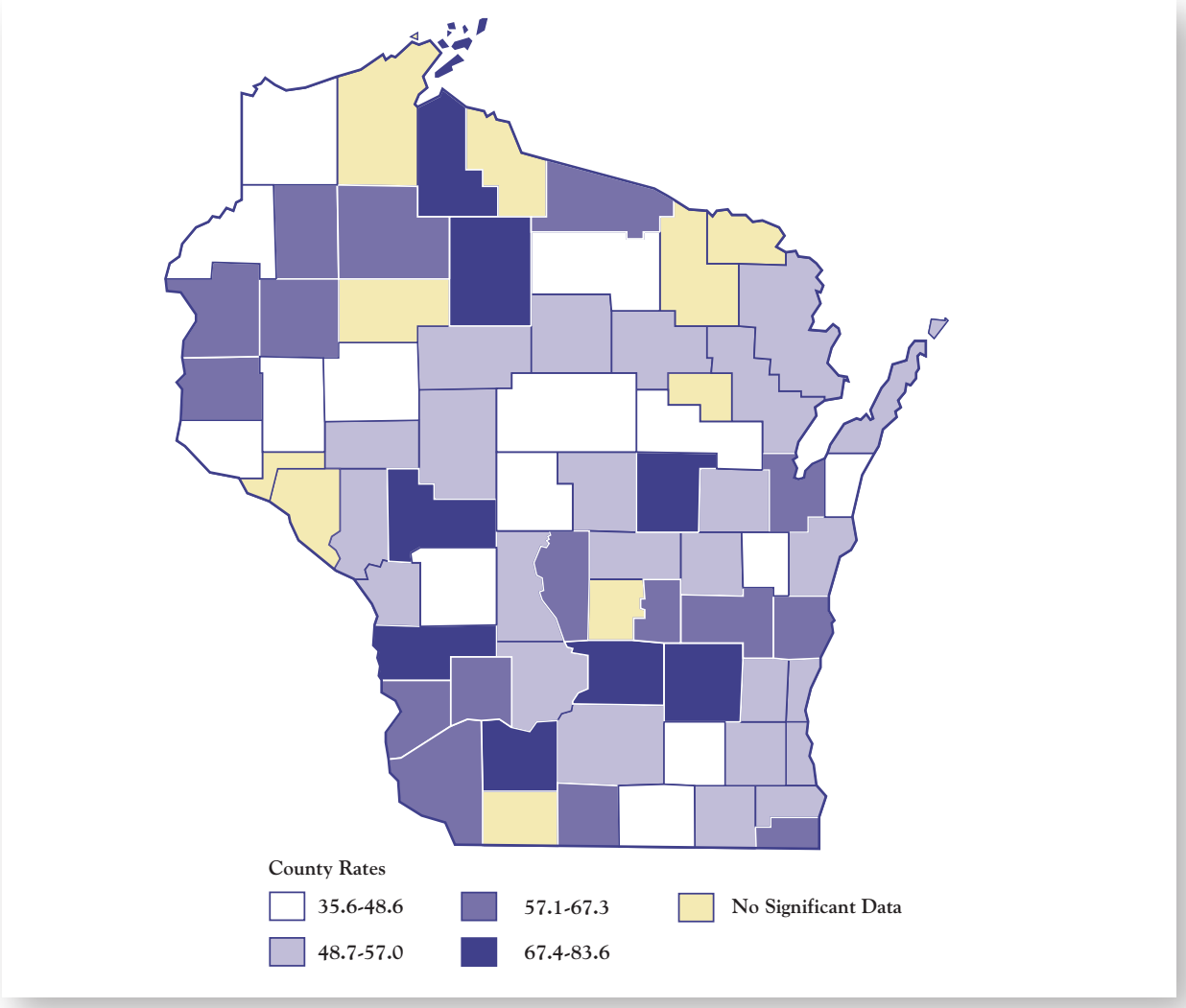
Table 4: Stroke Mortality Rates, by County, Wisconsin, 1996-2000 and 2001-2004

County	Annual Average No. Deaths 1996-2000	Annual Average No. Deaths 2001-2004	Age-Adj. Mortality Rate 1996-2000	Age-Adj. Mortality Rate 2001-2004	% Change in Age-Adj. Mortality Rate
Wisconsin Total	3,686	3,347.5	65.1	54.6	-16.1%
Adams	13.2	15.8	56.5	59.8	5.8%
Ashland	17.8	18.8	74.9	74.9	0.0%
Barron	36.6	43.0	58.2	65.9	13.2%
Bayfield	10.8	9.0	48.9	*	*
Brown	130.6	131.3	64.8	60.1	-7.3%
Buffalo	10.2	6.3	50.8	*	*
Burnett	15.0	10.0	68.0	40.3	-40.7%
Calumet	17.0	17.3	44.2	45.8	3.7%
Chippewa	45.6	33.0	66.9	46.1	-31.1%
Clark	26.4	26.8	55.7	53.6	-3.8%
Columbia	52.4	51.8	81.6	76.2	-6.6%
Crawford	13.8	14.0	58.2	58.8	1.0%
Dane	214.0	204.5	66.5	55.4	-16.7%
Dodge	70.4	75.0	68.2	69.1	1.3%
Door	32.0	24.5	76.8	54.2	-29.4%
Douglas	29.0	23.0	51.6	42.6	-17.5%
Dunn	22.0	16.8	55.5	39.0	-29.8%
Eau Claire	58.2	52.8	60.8	51.0	-16.2%
Florence	4.2	2.5	*	*	*
Fond du Lac	76.4	78.8	66.0	62.2	-5.7%
Forest	6.4	6.0	*	*	*
Grant	39.6	44.8	63.2	66.5	5.2%
Green	34.4	29.0	78.1	63.8	-18.3%
Green Lake	21.8	19.8	66.4	62.3	-6.1%
Iowa	17.0	21.0	70.2	83.6	19.1%
Iron	6.2	5.3	*	*	*
Jackson	19.2	19.0	76.8	79.3	3.3%
Jefferson	55.0	36.8	74.2	45.0	-39.4%
Juneau	18.8	18.3	59.0	53.2	-9.85%
Kenosha	98.4	99.0	71.4	67.3	-5.73%
Kewaunee	15.4	13.8	57.8	48.0	-17.0%
La Crosse	81.4	66.3	72.5	56.1	-22.6%
Lafayette	10.6	8.3	51.8	*	*
Langlade	18.0	18.8	57.9	55.0	-5.0%
Lincoln	25.6	22.5	68.0	52.1	-23.4%
Manitowoc	65.6	64.5	57.8	57.0	-1.4%
Marathon	62.4	67.5	47.4	46.4	-2.2%
Marinette	25.2	33.0	40.3	52.0	28.9%
Marquette	13.4	8.5	63.2	*	*
Menominee	1.4	*	*	*	*
Milwaukee	678.0	556.3	68.5	55.0	-19.7%
Monroe	30.6	23.8	68.0	47.5	-30.2%
Oconto	31.0	23.0	70.6	52.3	-25.9%
Oneida	32.0	25.5	63.8	47.7	-25.2%
Outagamie	94.2	79.3	63.7	50.4	-20.9%
Ozaukee	48.8	47.8	64.5	54.7	-15.2%
Pepin	8.6	8.5	*	*	*
Pierce	17.8	14.8	60.3	47.1	-21.9%
Polk	36.4	36.0	71.0	62.7	-11.7%
Portage	41.0	31.5	70.9	48.9	-31.1%
Price	18.2	18.0	63.0	69.2	9.9%
Racine	109.4	104.8	59.6	53.6	-10.1%
Richland	17.2	17.3	63.6	61.6	-3.1%
Rock	102.4	79.8	65.2	48.6	-25.4%
Rusk	12.8	8.3	56.0	*	*
St Croix	34.0	35.3	64.2	58.1	-9.5%
Sauk	38.0	38.3	56.8	53.1	-6.4%
Sawyer	12.2	13.5	52.5	59.5	13.3%
Shawano	39.0	21.0	65.7	35.6	-45.8%
Sheboygan	90.4	80.8	67.1	58.2	-13.2%
Taylor	12.2	14.5	47.1	52.0	10.3%
Trempealeau	26.0	21.3	59.0	52.1	-11.8%
Vernon	25.6	30.3	59.1	70.7	19.6%
Vilas	19.4	20.5	55.3	58.0	4.8%
Walworth	56.4	59.0	58.1	54.7	-5.9%
Washburn	12.2	16.8	47.5	67.1	41.3%
Washington	81.0	62.8	80.7	53.5	-33.7%
Waukesha	198.2	188.8	67.8	49.6	-26.9%
Waupaca	62.8	56.8	85.6	72.7	-15.1%
Waushara	13.4	18.5	42.3	54.1	27.8%
Winnebago	103.2	93.0	62.0	53.0	-14.6%
Wood	51.8	45.3	54.1	42.4	-21.7%

Annual average number of deaths calculated by dividing total deaths for the period (1996-2000 and 2001-2004) by five and four respectively.
All rates are age-adjusted to the US 2000 Standard Population and expressed in deaths/100,000 population (see Technical Notes).
* Rates and percent change are not reported if there were less than 50 deaths over the five-year/four-year period.
Percent change measures change from 1996-2000 to 2001-2004
Source: Wisconsin Deaths, Bureau of Health Information and Policy, DPH, Wisconsin Department of Health and Family Services

Map 2:
Age-Adjusted Stroke Mortality Rates, by County, Wisconsin, 2001-2004

Wisconsin rate: 54.6 deaths/100,000 population



Source: Wisconsin Deaths, Bureau of Health Information and Policy, DPH, Wisconsin Department of Health and Family Services

Hospitalizations

Hospitalizations and their associated charges is one way to examine the economic burden of cardiovascular disease (CVD). In addition to the high death toll, Wisconsin adults who experience heart attack, stroke, or other CVD events, are hospitalized and may have repeated hospitalizations.

In 2004, there were a total of 670,247 inpatient discharges from Wisconsin hospitals. Over 14%, or 95,770 inpatient discharges, were for major CVD with total charges of over $2.5 billion. All costs shown in table 5 such as number of hospitalizations, length of stay, and total charges were compiled based on principal diagnosis groups (PDG). Wisconsin residents comprised 96% of the total major CVD discharges and the remaining 4% were from other states. Some codes associated with these diagnoses may be included in more than one group, (e.g. coronary heart disease, congestive heart failure and one code in hypertensive disease are included in diseases of the heart).

Table 5:
Number of Hospital Discharges*, by Principal Diagnosis Groups, with Associated Length of Stay and Charges, Wisconsin Hospitals, 2004

Principal Diagnosis Groups**	Total Number	Average Length of Stay (Days)	Total Inpatient Days	Average Charge per Stay	Total Charge of all Stays
MAJOR HEART DISEASE	95,770	4.4	418,160	$26,690	$2,556,062,041
Diseases of the Heart	72,500	4.1	295,105	$27,631	$2,000,258,717
Coronary Heart Disease	33,702	3.7	123,518	$33,497	$1,128,900,309
Congestive Heart Failure	16,187	4.7	76,818	$18,362	$297,231,614
Arterial Disorders	5,897	7.7	45,237	$37,891	$223,443,127
Stroke	15,161	4.6	69,289	$18,886	$286,337,297
Hypertensive Disease	3,215	4.2	13,346	$18,771	$60,350,356
DIABETES	6,997	4.7	33,203	$16,516	$115,568,399

* Includes discharges of persons living or dead.

** These groups are not mutually exclusive. See Technical Notes for associated codes.

Source: Inpatient Hospitalization Discharge file, Bureau of Health Information and Policy, Division of Public Health, Wisconsin Department of Health and Family Services; prepared from data collected by the Bureau of Health Information and Policy through September 30, 2003 and thereafter by the Wisconsin Hospital Association Information Center, Inc.

- Over 14% (95,770) of all hospital discharges in Wisconsin were for a PDG of CVD.
- These hospitalizations consumed enormous health and financial resources. There were nearly 420,000 days spent in the hospitals for a PDG of CVD, and charges for these admissions totaled over $2.5 billion.
- For CVD, the average length of stay declined to 4.4 days compared to 4.7 days in 2000, and the average charge per stay increased more than $9,200 (53%) from $17,419 in 2000.
- Other indirect costs associated with CVD, including long-term care, rehabilitation, medications, lost productivity, and lost family resources, are not reflected in figures listed on Table 5 and those indirect costs could be as much as $5 billion.[2]

Hospitalizations continued

Table 6 lists the number of hospitalizations and rates for specific racial/ethnic groups. Although whites have a higher rate of hospitalization, caution should be taken when making comparisons since these are not age-adjusted rates. There were very few hospitalizations for some diseases among some racial/ethnic groups.

Table 6: Number of Hospital Discharges and Rates*, by Race/Ethnicity, by Principal Diagnosis Groups, Wisconsin Hospitals, 2004

Principal Diagnosis Group**	# White	Rate	# Blacks	Rate	# Asian	Rate	# Am. Indian	Rate	# Hispanic	Rate
MAJOR HEART DISEASE	86,646	17.4	5,707	17.4	507	4.8	441	8.6	1311	5.5
Diseases of the heart	66,043	13.3	3,907	11.9	296	2.8	377	7.3	944	4.0
Coronary Heart Disease	30,956	6.2	1,399	4.3	147	1.4	198	3.8	476	2.0
Congestive Heart Failure	14,260	2.9	1,393	4.3	79	0.7	99	1.9	204	0.9
Arterial disorders	5,352	1.1	367	1.1	17	**	37	**	90	0.4
Stroke	13,742	32.8	885	2.7	98	0.9	78	1.5	192	0.8
Hypertensive disease	2,260	0.5	759	2.3	36	**	21	**	96	0.4
DIABETES	5,365	1.1	1167	3.6	46	**	121	2.4	232	1.0

* Rate: These are ratios of the number of discharges per 1,000 population. These discharges may include more than one hospitalization for a person and the discharge categories are not exclusive. See technical notes for associated codes and population denominators. Rates are not reported if there were less than 50 hospitalizations.

** These groups are not mutually exclusive. See Technical Notes for associated codes.

Source: Inpatient Hospitalization Discharge file, Bureau of Health Information and Policy, Division of Public Health, Wisconsin Department of Health and Family Services; prepared from data collected by the Bureau of Health Information and Policy through September 30, 2003 and thereafter by the Wisconsin Hospital Association Information Center, Inc.

Table 6A: Number of Hospital Discharges*, by Age Groups and Sex, by Principal Diagnosis Groups, Wisconsin Hospitals, 2004

Principal Diagnosis Group**	Age groups by sex											
	< 35		35-44		45-54		55-64		65-74		75+	
	M	F	M	F	M	F	M	F	M	F	M	F
MAJOR HEART DISEASE	1,021	768	2,339	1,369	6,550	3,473	10,371	5,718	12,893	9,106	18,408	22,754
Diseases of the Heart	736	502	1,899	970	5,397	2,545	8,307	4,277	9,788	6,755	13,822	17,502
Coronary Heart Disease	116	34	1,017	373	3,387	1,283	5,245	2,168	5,408	3,221	5,527	5,914
Congestive Heart Failure	88	49	210	98	542	342	982	767	1,749	1,299	4,289	5,772
Arterial disorders	89	70	85	67	300	172	593	327	1,034	676	1,226	1,258
Stroke	97	128	190	226	644	571	1,279	934	1,946	1,463	3,163	4,520
Hypertensive disease	115	78	205	123	280	232	243	234	207	308	349	841
DIABETES	738	745	559	382	719	475	605	479	533	465	605	692

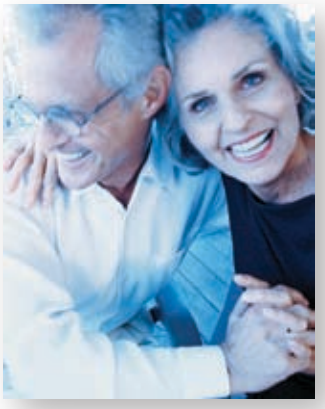
* Includes discharges of persons living or dead.

** These groups are not mutually exclusive. See Technical Notes for associated codes.

Source: Inpatient Hospitalization Discharge file, Bureau of Health Information and Policy, Division of Public Health, Wisconsin Department of Health and Family Services; prepared from data collected by the Bureau of Health Information and Policy through September 30, 2003 and thereafter by the Wisconsin Hospital Association Information Center, Inc.

- For most age groups, males have a higher number of hospital discharges than females in all eight causes.
- Females have higher discharge rates than males for all eight causes in the age 75+ group

Prevalence of Risk Factors for Cardiovascular Disease - Adults



Many risk factors for cardiovascular disease can be modified, meaning that with behavior change individuals may reduce their risk. These risk factors include smoking, high blood pressure, high blood cholesterol levels, being overweight or obese, lack of physical activity, and diet. Reduction in risk may slow the process of arterial blockage and decrease the risk of a heart attack or stroke.

Prevalence estimates of these risk factors in Wisconsin and the nation are from the Behavioral Risk Factor Surveillance System (BRFSS). This is an annual, random digit-dialed, telephone survey of adults 18 years of age and older in each state to determine the prevalence of risk factors and risk behaviors (see technical notes). Since not all risk factors are available for states in all years, these data are generated from either the 2004 or 2005 survey, depending on availability.

Table 7: Percent of Adults with Risk Factors for Cardiovascular Disease, Wisconsin, Minnesota, Illinois, and the United States, Wisconsin National ranking, 2005

	WI (%)	MN (%)	IL (%)	Nationwide*		WI Rank**
				Range %	Median %	
Risk Factor						
Diabetes	6.6	5.8	7.9	4.1 – 12.5	7.3	14
Current Smoker	20.7	20.0	19.9	8.1 – 28.7	20.5	30
High blood pressure	25.0	21.9	25.5	18.4 – 33.3	25.5	24
High cholesterol	35.5	32.6	36.2	30.3 – 39.9	35.6	26
Overweight (includes obese)	59.1	60.3	59.5	53.0 – 65.6	60.3	11
Lack of regular physical activity	43.4	49.0	52.9	40.8 – 85.7	51.3	3
Less than 5 fruits & vegetables/day	77.8	75.5	76.0	67.6 – 85.7	76.8	34

* Range is the percentage of adults with this risk factor reported for the lowest and highest state; median is the percentage reported by the state in the middle.

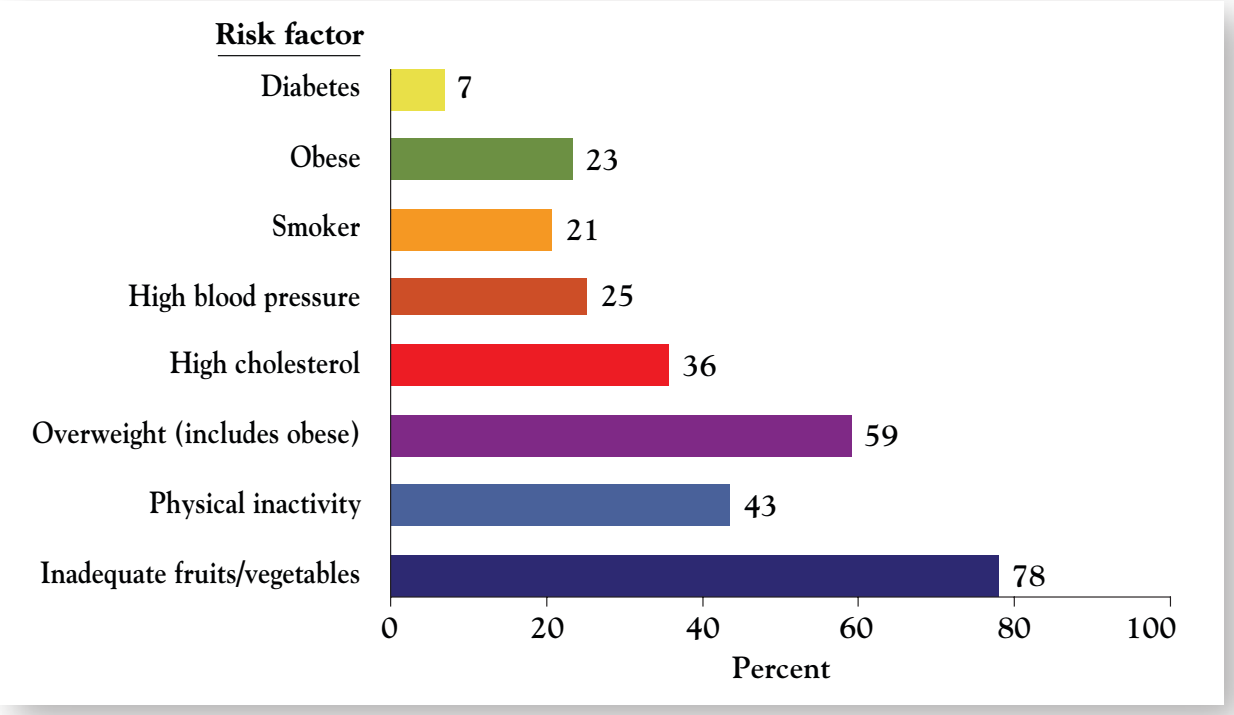
** WI Rank: This is the Wisconsin rank out of 53 (50 states, District of Columbia, Virgin Islands and Puerto Rico). A rank of 1 would be the state/territory reporting the lowest percentage of adults with this risk factor (or the best); 53 would be the state/territory reporting the highest percentage of adults with this risk factor.

Source: Wisconsin Behavioral Risk Factor Survey 2005. Bureau of Health Information and Policy, DPH, Wisconsin Department of Health and Family Services

Source: Behavioral Risk Factor Surveillance System, Centers for Disease Control and Prevention (CDC)

- The actual differences in the prevalence of certain risk factors are small, when compared with neighboring states and the nationwide median.
- Wisconsin ranks below the national median for all of the above risk factors, except current smoker and less than five fruits and vegetables per day.
- Wisconsin has fewer people who classified as overweight or obese than Illinois and Minnesota.
- Wisconsinites are more likely to be active than Illinois or Minnesota residents.
- Wisconsin has more people identified as current smokers and more people who consume less than five fruits & vegetables/day than Illinois and Minnesota.

Figure 9:
Percent of Adults with Risk Factors for Cardiovascular Disease, Wisconsin, 2005



Source: Wisconsin Behavioral Risk Factor Surveillance System 2005. Bureau of Health Information and Policy, DPH, Wisconsin Department of Health and Family Services

Diabetes:

- About seven percent of adults in Wisconsin report they have been told by a health professional that they have diabetes. Two-thirds of people with diabetes died of some form of heart or blood vessel disease.[2]

Tobacco Smoke:

- The prevalence of cigarette smoking among Wisconsin adults in 2005 was 21%. This percentage has remained relatively constant over the past decade (range: 21-25%),[3] despite public awareness of the detrimental effects of smoking.
- In 2004, 2,342 (14%) heart disease and stroke deaths in Wisconsin were attributed to smoking. This comprises 32.5% of all smoking attributable deaths.[4]

High Blood Pressure:

- High blood pressure is a major risk factor for both heart disease and stroke. One in four Wisconsin adults reported having been told by a health professional that they have high blood pressure.
- A national report shows that of those with high blood pressure, 32% are actually unaware they have high blood pressure, 27% are on medication and have their blood pressure controlled, 26% are on medication but do not have their blood pressure controlled, and 15% are not on medication.[5]

Prevalence of Risk Factors for Cardiovascular Disease - Adults continued

High Blood Cholesterol:

- High blood cholesterol contributes to atherosclerosis, the gradual build up of fatty plaques in the arteries that may lead to heart attack and stroke. One in three Wisconsin adults has been told by a health professional that they have high cholesterol.
- A ten percent decrease in total cholesterol levels may result in an estimated 30% reduction in coronary heart disease.[6]

Overweight (including Obesity):

- These estimates were calculated as body mass index (BMI) based on a person's reported height and weight (see technical notes). Overweight is defined as a BMI of 25.0 Kg/m^2 to 29.9 Kg/m^2 and obesity is defined as a BMI of 30.0 Kg/m^2 or greater.
- Fifty-nine percent (59%) of Wisconsin adults were overweight. This included 23% of adults that were obese.
- In the past decade, the percent of Wisconsin adults who were obese has increased from 16% in 1995 to 23% in 2005.[3]

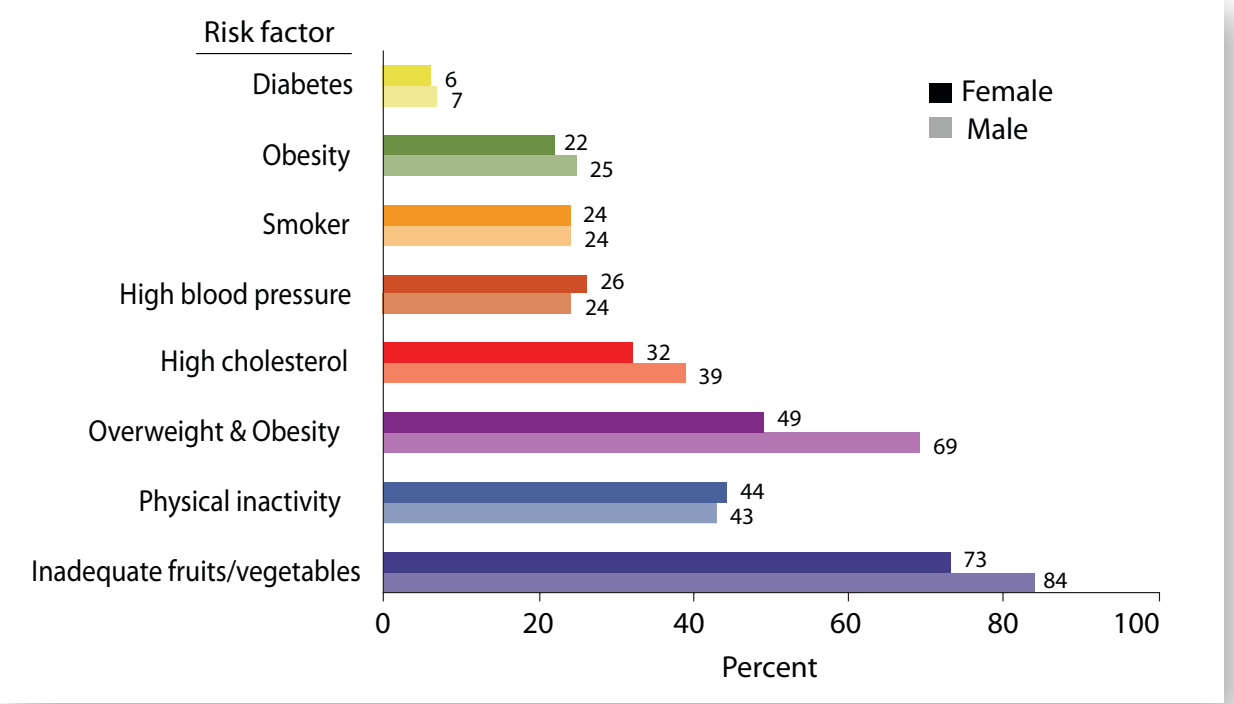
Physical Inactivity:

- More than half of Wisconsin adults were physically active on a regular basis. Forty-three percent reported they do not get regular physical activity (at least 30 minutes of moderate intensity physical activity on most days of the week).
- The relative risk of coronary heart disease associated with physical inactivity ranged from 1.5 to 2.4, an increased risk comparable to that observed for high blood pressure, high blood cholesterol, or cigarette smoking.[7]
- Less active persons have a 30-50% greater risk of developing high blood pressure.[8]

Inadequate Amount of Fruits and Vegetables (Nutrition):

- Good nutrition is important for preventing heart disease and stroke. Healthy food habits help maintain normal blood pressure, desirable blood cholesterol levels and a healthy body weight.
- Seventy-eight percent (78%) of Wisconsin adults reported not eating five or more servings of fruits and/or vegetables a day. Therefore, only 22% of adults reported eating an adequate amount of fruits and vegetables.

Figure 10:
Percent of Adults with Risk Factors for Cardiovascular Disease, by Sex, Wisconsin, 2005



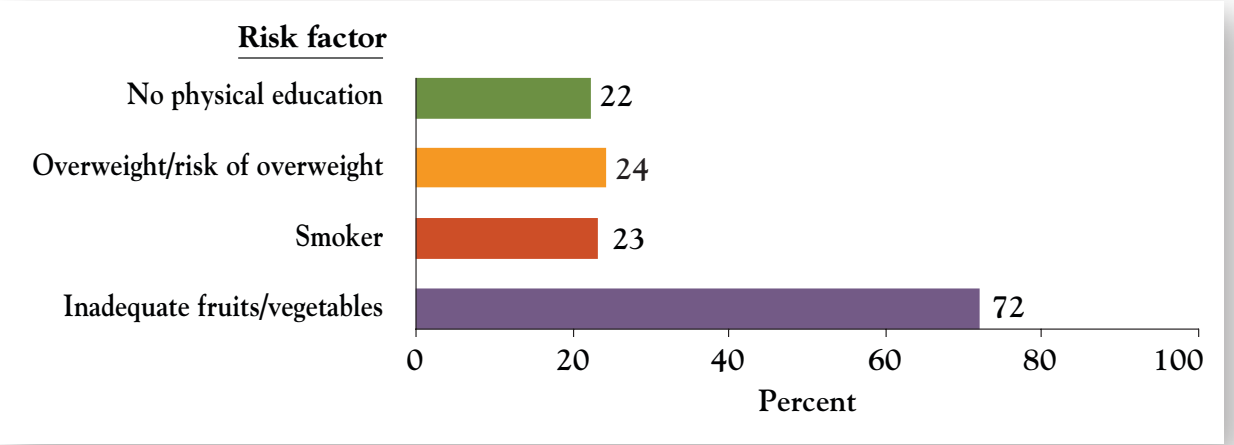
Source: Wisconsin Behavioral Risk Factor Surveillance System 2005, Bureau of Health Information and Policy, DPH, Wisconsin Department of Health and Family Services

- There was little difference in prevalence between males and females for most cardiovascular risk factors except high cholesterol, overweight/obesity, and inadequate fruits/vegetables.
- Thirty-nine percent (39%) of men reported having been told by a health professional that they have high blood cholesterol compared to 32% of women.
- The prevalence of overweight was 69% in males compared to 49% in females.
- Seven-eight percent of Wisconsin adults did not eat an adequate amount of fruits and vegetables, five servings or more. Men were less likely than women to eat five or more servings of fruits and/or vegetables a day, 84% and 73% respectively for men and women.

Prevalence of Risk Factors for Cardiovascular Disease - Youth

Many of the risk factors for cardiovascular disease are established in youth. The following are data from the 2005 Wisconsin Youth Risk Behavior Survey (YRBS). This is a random survey conducted every two years among public schools with grades 9-12. In 2005, the survey was administered to 2,389 students in 52 public schools.[10]

Figure 11: Percent of High School Students with Risk Factors for Cardiovascular Disease, Wisconsin, 2005



Source: 2005 Wisconsin Youth Risk Behavior Survey, Division of Learning Support, Wisconsin Department of Public Instruction
Source: Tracking Healthiest Wisconsin 2010 State-Level Data. http://dhfs.wisconsin.gov/statehealthplan/track2010/pdf/data/B2a2fvconshss.pdf

Physical activity:

- Twenty-two percent (22%) of students reported not being enrolled in physical activity at school.
- Sixty-seven percent (67%) of students reported participating in strenuous physical activity that made them sweat and breathe hard for at least 20 minutes on three or more of the previous seven days.
- Twenty-eight percent (28%) reported having moderate physical activity on at least five of the seven previous days.

Overweight:

- Twenty-four percent (24%) of students were defined as overweight or at risk for being overweight. In adolescents, overweight is defined as sex- and age-specific body mass index (BMI) at 95th percentile or greater based on the Centers for Disease Control and Prevention growth charts. A BMI at greater than or equal to the 85th percentile but less than the 95th percentile designates an adolescent at risk for overweight (see technical notes).

Tobacco Smoke:

- Almost one in four (23%) high school students reported smoking cigarettes at least one day of the past 30. This included a range of 17% for ninth graders to 28% for eleventh graders.
- Fewer students reported smoking in 2005 than in 1993 (23% vs. 32%).

Inadequate Amount of Fruits and Vegetables (Nutrition):

- Seventy-two percent (72%) of students did not eat five or more servings of fruits/vegetables every day.
- Eighty-two percent (82%) of students did not eat three or more servings of vegetables on the day prior to the survey.
- Sixty-eight percent (68%) of students did not eat three or more servings of fruits on the day prior to the survey.

Summary

This report summarizes the most recent information available on cardiovascular disease, coronary heart disease, stroke deaths, hospitalizations, and associated risk factors in Wisconsin. The data presented demonstrate a need for efforts to prevent and reduce complications of cardiovascular disease. The trend in declining rates for CVD deaths is leveling, and the documented prevalence of unhealthy behaviors puts Wisconsin adults as well as youth at increased risk for heart disease and stroke.

Healthiest Wisconsin 2010: A Partnership Plan to Improve the Health of the Public, has identified the following health priorities.11 They influence both health and illness and each have behavioral, environmental, and societal dimensions. The health and system priorities are interwoven, complementary, and cross-cutting.

- Access to Primary and Preventive Health Services
- Adequate and Appropriate Nutrition
- Alcohol and Other Substance Use and Addiction
- Environmental and Occupational Health Hazards
- Existing, Emerging, and Re-Emerging Communicable Diseases
- High Risk Sexual Behavior
- Intentional and Unintentional Injuries and Violence
- Mental Health and Mental Disorders
- Overweight, Obesity, and Lack of Physical Activity
- Social and Economic Factors that Influence Health
- Tobacco Use and Exposure

These health priorities significantly affect a number of key conditions. They have the greatest potential leverage for improving the health of the people of Wisconsin. By reducing one or more risk factors will reduce the chance of developing diseases. For example, tobacco has a major influence on the development of cardiovascular disease, lung cancer, and asthma. Similarly, reducing the prevalence of overweight and obesity and increasing physical activity are keys in the prevention of cardiovascular disease, diabetes and other conditions. Addressing tobacco, overweight and obesity, and physical activity influences a great number of health conditions and diseases because there are common underlying causes.

These eleven health priorities are important for all Wisconsin residents. Addressing them requires intensive, collaborative action by many partners in Wisconsin's private and public health sectors. Collectively, they require primary prevention approaches on both individual and population-based levels. Clinical practice can identify actual and potential risk for individuals and provide health promotion and disease prevention guidance and intervention. Population-based interventions are complex, and public health system partners need to be concerned not only with the determinants of health, but also with the social determinants of health.

Programs need multiple intervention approaches. These include education, social support, laws, policy changes, social and economic incentives, and behavioral changes. These interventions need multiple levels of focus i.e. individuals, families, communities, and populations.

Ideally, impacting the determinants of health for cardiovascular disease requires coordination of epidemiological science and public health practice. Linkages need to be made between local health departments, *The Wisconsin Plan for Heart Disease and Stroke Prevention 2005-2009* and H*ealthiest Wisconsin 2010*. The *Wisconsin Heart Disease and Stroke Surveillance Summary Update - 2007* will provide an update to monitor progress and provide a basis for program planning, evaluation and measurement of changes in health status.

Technical Notes

Mortality data: Mortality data for Wisconsin (1990-2004) are from the Bureau of Health Information and Policy, Division of Public Health, Wisconsin Department of Health and Family Services. The source of these data is resident death certificates filed with the State Registrar, Vital Records Section, Bureau of Health Information and Policy, Division of Public Health, Department of Health and Family Services, as mandated by Chapter 69 of the Wisconsin Statutes. Most resident deaths occurred in Wisconsin, although the death file includes certificates for Wisconsin residents who died in other states and countries as well. The Bureau of Health Information and Policy produces an annual report, *Wisconsin Deaths*, which provides key information about deaths of Wisconsin residents. Additional information about mortality data can be obtained at http://www.dhfs.wisconsin.gov/deaths/index.htm.

National trend data were provided by the American Heart Association (AHA), Biostatistics Consultant, National Center, Dallas, Texas.

Prior to 1999, causes of death were coded using the International Classification of Diseases, Ninth Revision (IDC 9). Beginning in 1999, causes of death were coded using the International Classification of Diseases, Tenth Revision (ICD-10). For this report, cause of death refers to "Underlying Cause of Death." The code groups used include:

- Major cardiovascular disease (ICD-9: 390-448; ICD-10: I00-I78)
- Disease of the heart (ICD-9: 390-398, 402, 404-429; ICD-10: I00-I09, I11, I13-I51)
- Ischemic (coronary) heart disease (ICD-9: 410-414.9, 429.2; ICD-10: I20-I25)
- Congestive heart failure (ICD-9: 428; ICD-10: I50)
- Cerebrovascular disease (Stroke) (ICD-9: 430-438; ICD-10: I60-I69)
- Diabetes (ICD-9: 250; ICD-10: E10-E14)

Additional codes used in Table 1:

- Hypertensive heart disease (ICD-10: I11, I13)
- Other diseases of the heart (ICD-10: I00-I09, I26-I49, I51)
- Primary hypertension/hypertensive renal disease (ICD-10: I10, I12)
- Atherosclerosis (ICD-10: I70)
- Other diseases of the circulatory system (ICD-10: I71-I78)

Please note that these categories are not exclusive. Also, Wisconsin and AHA data vary slightly in the codes that were included for coronary heart disease; AHA did not include ICD 429.2 in their analysis of rates from 1980-1998. Rates for 1999 utilized ICD-10 codes, which are inclusive of ICD 429.2.

For data presented by county or by racial/ethnic group, rates were calculated by combining deaths for a five or four year period (1996-2000 or 2001-2004) to allow for sufficient deaths to calculate a rate. The standard categories used in this report reflect the availability of racial and ethnic data in Wisconsin. All racial group categories are 'race only' categories which exclude Hispanics/Latinos, whereas the Hispanic/Latino category includes all races of Hispanic/Latino ethnicity. In other words, a death is counted in a racial/ethnic category only once. For example, the death of a Hispanic/Latino white would be counted in the Hispanic/Latino category and not the white category. The term 'other' refers to any deaths not represented in any other category. For the purposes of this report, a rate was calculated if there were at least 50 deaths in the five year period or 40 deaths in the four-year period. Rates were not reported if there were less than 50 deaths in a five-year period or 40 deaths in the four-year period.

Mortality data includes deaths of all ages, and rates are age-adjusted to the 2000 US standard population.

Hospitalizations:

Hospitalization information is from the Bureau of Health Information and Policy, Division of Public Health, Wisconsin Department of Health and Family Services 2004 Inpatient Hospital Discharge Database. Data collection activities for hospital inpatients, emergency department visits, ambulatory surgeries, and hospital facilities have been transferred by a change in statutes (ch. 153, Wis. Stats.) to the Wisconsin Hospital Association (WHA), effective January 1, 2004. Those wishing to purchase hospital inpatient, emergency department visit, ambulatory surgery, or hospital facility data should contact the WHA Information Center at http://www.whainfocenter.com. Hospitals in this dataset include acute care hospitals, non-federal hospitals, including general medical/surgical, psychiatric, alcohol and other drug abuse (AODA), rehabilitation centers and state institutions.

These data include all ages (children as well as adults). Hospitalization records are based upon the county of residence of the person hospitalized – not the county where the person is hospitalized. Hospitalizations for non-Wisconsin residents are included (3.5% of hospitalizations), but Wisconsin residents hospitalized outside of Wisconsin are not included.

The categories for this section utilized the following ICD-9 codes for the "Principal Diagnosis Code:"

- Major cardiovascular disease (ICD-9: 390-448)
- Disease of the heart (ICD-9: 390-398, 402, 404-429)
- Ischemic (coronary) heart disease (ICD-9: 410-414)
- Congestive heart failure (ICD-9: 428)
- Cerebrovascular disease (Stroke) (ICD-9: 430-438)
- Diabetes (ICD-9: 250)
- Hypertensive disease (ICD-9: 401-404)
- Arterial disorders (ICD-9: 440-448)

Please note that these categories are not exclusive. Discharges include people living and dead.

Rates reported are a ratio of the number of inpatient discharges over the specific population and reported per 1,000 population. This is a ratio because a person hospitalized more than once will be counted more than once. See the section on Wisconsin population for the denominators used to calculate these ratios. Rates were not reported if there were less than 50 hospitalizations.

Adult risk factors:

All adult risk factor data are from 2005 Wisconsin Behavioral Risk Factor Survey (BRFS). Risk factor information includes only those persons 18 years and older. The Wisconsin BRFS is part of the national Behavioral Risk Factor Surveillance System (BRFSS). It is an annual telephone-administered health survey coordinated by the U.S. Centers for Disease Control and Prevention. Wisconsin BRFS data collection is managed by the DHFS Bureau of Health Information. The BRFS data used in this report are weighted to adjust for disproportional sampling. Additional information about the Wisconsin BRFS can be obtained at http://dhfs.wisconsin.gov/stats/BRFS.htm

continued

Body mass index (BMI) is defined as weight in kilograms divided by height in meters squared (kg/m2). For this report, obese is defined as a BMI of 30 or greater and overweight is defined as a BMI of 25 or greater. Therefore, the percentage of persons who are overweight includes those who are obese. The definition of high blood pressure is the percentage of persons who answered "Yes" to the question "Have you ever been told by a doctor, nurse, or other health professional that you have high blood pressure?" The definition of high cholesterol is the percentage of persons who answered "Yes" to the question "Have you ever been told by a doctor or other health professional that your blood cholesterol is high?" The definition of lack of physical activity is "Adults with 30+ minutes of moderate physical activity five or more days per week, or vigorous physical activity for 20+ minutes three or more days per week." The definition of current smoker is the percentage of persons who have ever smoked 100 cigarettes in their lifetime and reported smoking every day or some days. The definition of less than 5 servings of fruit/vegetables is the percentage of persons who report they do not consume five or more servings a day.

Youth risk factors:

All youth risk factor data are from 2005 Wisconsin Youth Risk Behavior Survey (YRBS). The YRBS is conducted among students in grades 9-12 in regular public schools. Systematic equal probability sampling with a random start was used to select classes from each school that participated in the survey. In Spring 2005, the survey was administered to 2,398 students from 52 public schools. The response rate was adequate to use these results to make estimates concerning all public high school students. In adolescents, overweight is defined as sex-specific and age-specific Body Mass Index (BMI) at 95th percentile or above based on the Centers for Disease Control and Prevention's growth charts. BMI at the 85th percentile or greater designates a child or adolescent at risk for being overweight. The BMI is calculated by the survey administrator based on the student's self reported height and weight. The definition of current smoker is having smoked tobacco on one or more of the previous 30 days. The definition of less than 5 servings of fruit/vegetables is the percentage of persons who report they do not consume five or more servings a day. All percentages are rounded to the nearest whole percent.

Population data and age-adjustment:

The age distribution of a population changes over time and from place to place. Because some diseases like coronary heart disease and stroke are more common in older people, comparing rates of populations, counties, or over a certain period of time can be misleading if the age distributions of the populations being compared are different. In order to make appropriate comparisons, rates are age-adjusted.

A rate is age-adjusted by applying an age-specific rate of the population of interest to a standard population, thus estimating the number of deaths that would occur in a standard population if it had the same age-specific rate. For the five-year or four-year period composite data (1996-2000 and 2001-2004) the Wisconsin population estimates for 2000 and 2004 were used to calculate the age-specific and race-specific rates. For the trend data, age-specific rates were calculated using population estimates for each year. Because Wisconsin population estimates from Wisconsin Bureau of Health Information and Policy may be more accurate than estimates from other sources, the rates may differ from those published nationally but should be a more accurate representation. Finally, all rates are standardized against the US 2000 standard population.

Age-adjusted rates by county were calculated for a five-year/four-year period because counties with small populations had too few deaths to calculate rates for a shorter interval. As noted, there are still some counties that had fewer than 50 deaths for the five-year period or 40 deaths for the four-year period; rates are not provided for these counties. Although rates are age-adjusted, caution should be taken when comparing one county to another, as counties with small populations and few numbers of deaths are more likely to have a wider variation in rates. Using a five-year average to calculate the rate should help this variation.

Wisconsin Population:

Population figures are 2004 census counts from the United States Census Bureau, provided by the Wisconsin Division of Public Health, Bureau of Health Information and Policy. These numbers provide the reader with the racial and ethnic profile of Wisconsin and were used as denominators for the hospitalization rates.

Wisconsin Population by Race/Ethnicity and Sex, April 1, 2004

Race	Male	Female	Total	Hispanic/ Latino Total*
White	2,461,879	2,504,621	4,966,500	217,583
Blacks or African American/African American	158,363	169,263	327,626	8,520
American Indian	25,617	25,846	51,463	4,634
Asian American	52,553	53,216	105,769	1,301
Native Hawaiian/Other Pac. Islander	1,111	1,045	2,156	561
Two or More Races	27,469	28,043	55,512	4,601
Total	2,649,041	2,714,634	5,363,675	237,200

* Hispanic/Latino could be any race and was included in total population estimated.

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