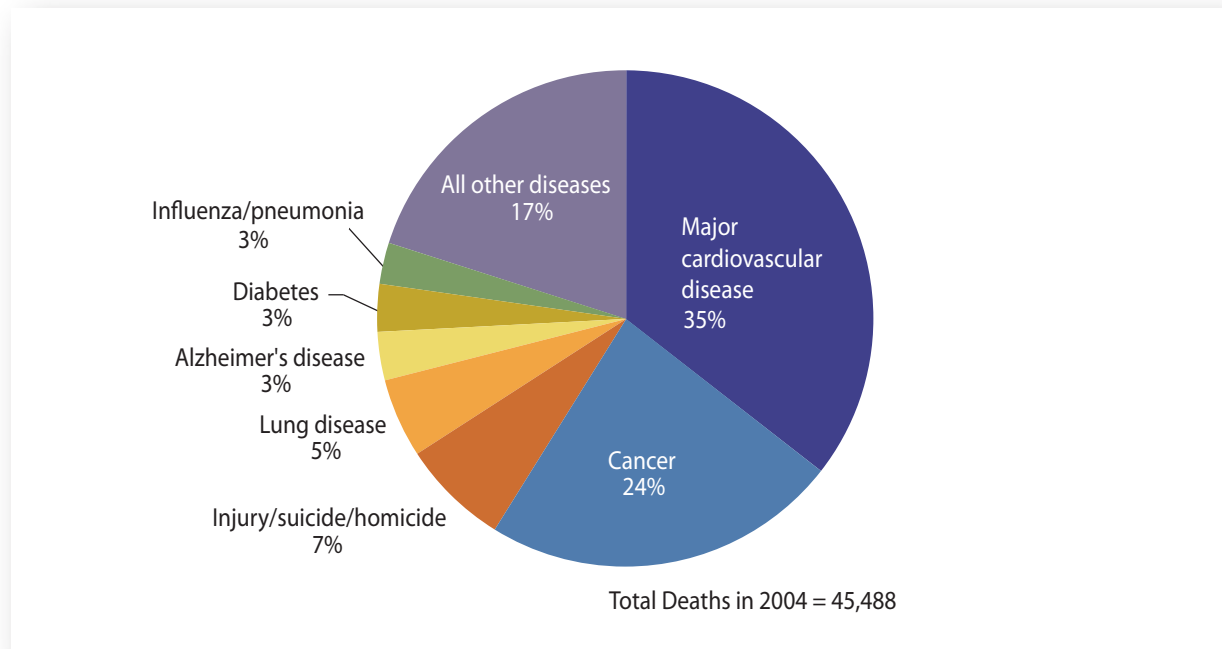


Mortality (Deaths)



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"

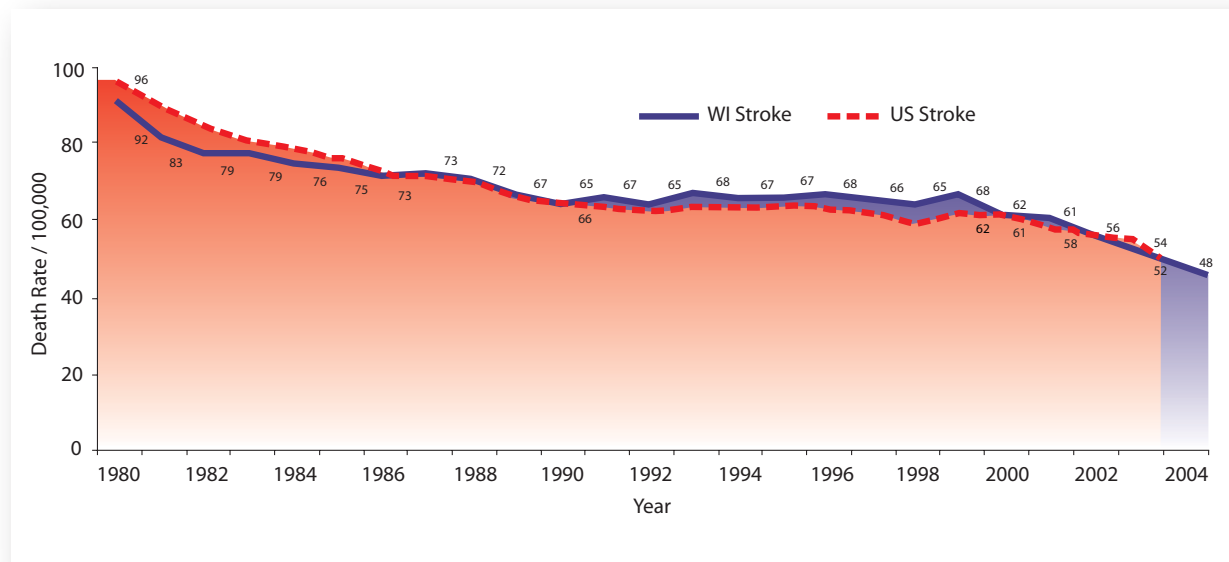
- The Disease of the Heart category accounted for 11,883 of Wisconsin resident deaths in 2004. This included 7,671 deaths for coronary (ischemic) heart disease, which accounted for nearly 48% of major CVD deaths or 17% of all Wisconsin deaths. Congestive heart failure, also in this category, accounted 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



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).

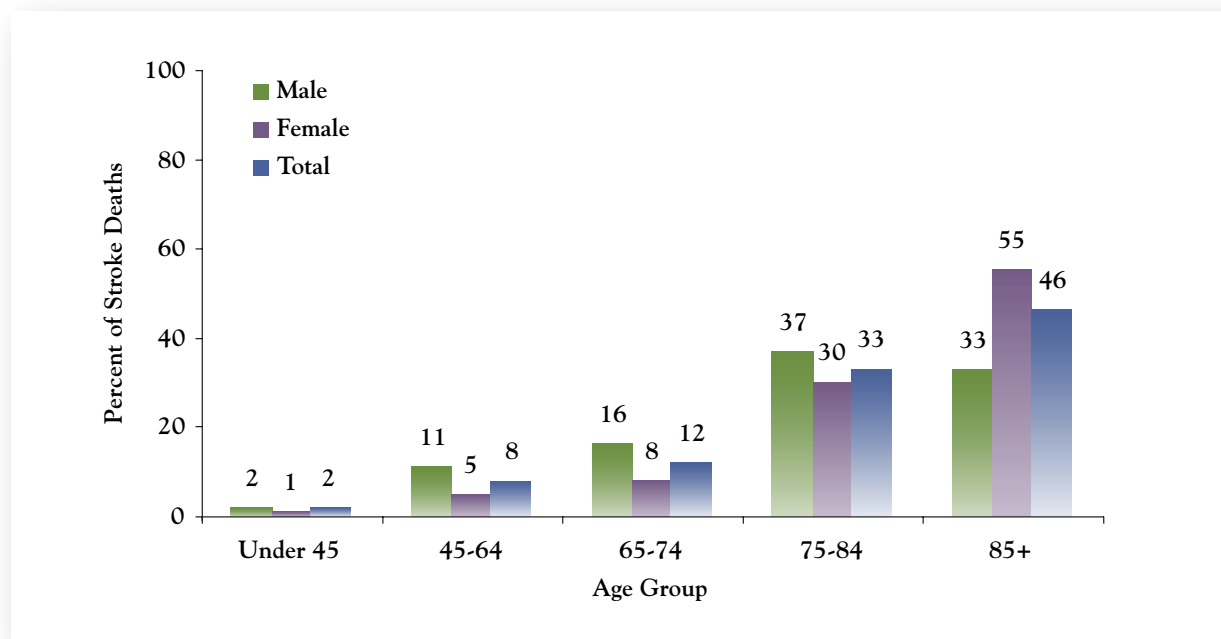
- The stroke mortality rate declined 48% in Wisconsin from 1980-2004 and 44% nationally from 1980-2003.
- Since 1986, the stroke mortality rate in Wisconsin has been greater or equal to the US mortality rate, however, since 2002, this trend has reversed.
- In 2002, Wisconsin ranked 27th in stroke deaths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

Mortality (Deaths) *continued*



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%

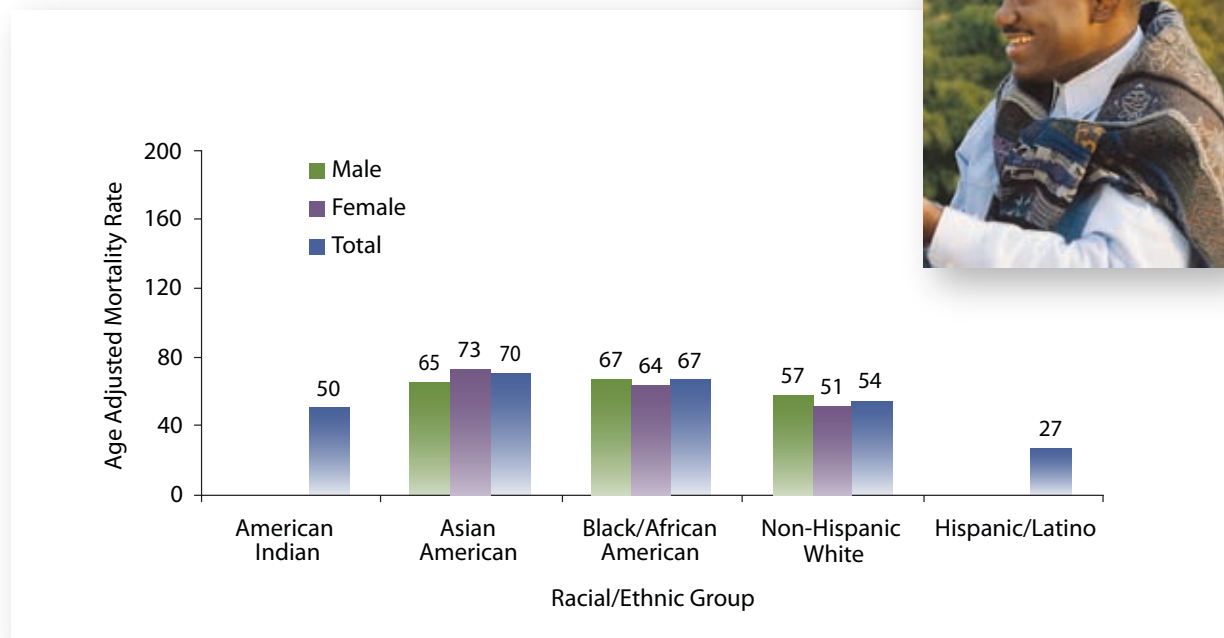
* Includes deaths before 65 years of age

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 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.

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	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%	Marathon	62.4	67.5	47.4	46.4	-2.2%
Adams	13.2	15.8	56.5	59.8	5.8%	Marinette	25.2	33.0	40.3	52.0	28.9%
Ashland	17.8	18.8	74.9	74.9	0.0%	Marquette	13.4	8.5	63.2	*	*
Barron	36.6	43.0	58.2	65.9	13.2%	Menominee	1.4	*	*	*	*
Bayfield	10.8	9.0	48.9	*	*	Milwaukee	678.0	556.3	68.5	55.0	-19.7%
Brown	130.6	131.3	64.8	60.1	-7.3%	Monroe	30.6	23.8	68.0	47.5	-30.2%
Buffalo	10.2	6.3	50.8	*	*	Oconto	31.0	23.0	70.6	52.3	-25.9%
Burnett	15.0	10.0	68.0	40.3	-40.7%	Oneida	32.0	25.5	63.8	47.7	-25.2%
Calumet	17.0	17.3	44.2	45.8	3.7%	Outagamie	94.2	79.3	63.7	50.4	-20.9%
Chippewa	45.6	33.0	66.9	46.1	-31.1%	Ozaukee	48.8	47.8	64.5	54.7	-15.2%
Clark	26.4	26.8	55.7	53.6	-3.8%	Pepin	8.6	8.5	*	*	*
Columbia	52.4	51.8	81.6	76.2	-6.6%	Pierce	17.8	14.8	60.3	47.1	-21.9%
Crawford	13.8	14.0	58.2	58.8	1.0%	Polk	36.4	36.0	71.0	62.7	-11.7%
Dane	214.0	204.5	66.5	55.4	-16.7%	Portage	41.0	31.5	70.9	48.9	-31.1%
Dodge	70.4	75.0	68.2	69.1	1.3%	Price	18.2	18.0	63.0	69.2	9.9%
Door	32.0	24.5	76.8	54.2	-29.4%	Racine	109.4	104.8	59.6	53.6	-10.1%
Douglas	29.0	23.0	51.6	42.6	-17.5%	Richland	17.2	17.3	63.6	61.6	-3.1%
Dunn	22.0	16.8	55.5	39.0	-29.8%	Rock	102.4	79.8	65.2	48.6	-25.4%
Eau Claire	58.2	52.8	60.8	51.0	-16.2%	Rusk	12.8	8.3	56.0	*	*
Florence	4.2	2.5	*	*	*	St Croix	34.0	35.3	64.2	58.1	-9.5%
Fond du Lac	76.4	78.8	66.0	62.2	-5.7%	Sauk	38.0	38.3	56.8	53.1	-6.4%
Forest	6.4	6.0	*	*	*	Sawyer	12.2	13.5	52.5	59.5	13.3%
Grant	39.6	44.8	63.2	66.5	5.2%	Shawano	39.0	21.0	65.7	35.6	-45.8%
Green	34.4	29.0	78.1	63.8	-18.3%	Sheboygan	90.4	80.8	67.1	58.2	-13.2%
Green Lake	21.8	19.8	66.4	62.3	-6.1%	Taylor	12.2	14.5	47.1	52.0	10.3%
Iowa	17.0	21.0	70.2	83.6	19.1%	Trempealeau	26.0	21.3	59.0	52.1	-11.8%
Iron	6.2	5.3	*	*	*	Vernon	25.6	30.3	59.1	70.7	19.6%
Jackson	19.2	19.0	76.8	79.3	3.3%	Vilas	19.4	20.5	55.3	58.0	4.8%
Jefferson	55.0	36.8	74.2	45.0	-39.4%	Walworth	56.4	59.0	58.1	54.7	-5.9%
Juneau	18.8	18.3	59.0	53.2	-9.85%	Washburn	12.2	16.8	47.5	67.1	41.3%
Kenosha	98.4	99.0	71.4	67.3	-5.73%	Washington	81.0	62.8	80.7	53.5	-33.7%
Kewaunee	15.4	13.8	57.8	48.0	-17.0%	Waukesha	198.2	188.8	67.8	49.6	-26.9%
La Crosse	81.4	66.3	72.5	56.1	-22.6%	Waupaca	62.8	56.8	85.6	72.7	-15.1%
Lafayette	10.6	8.3	51.8	*	*	Waushara	13.4	18.5	42.3	54.1	27.8%
Langlade	18.0	18.8	57.9	55.0	-5.0%	Winnebago	103.2	93.0	62.0	53.0	-14.6%
Lincoln	25.6	22.5	68.0	52.1	-23.4%	Wood	51.8	45.3	54.1	42.4	-21.7%
Manitowoc	65.6	64.5	57.8	57.0	-1.4%						

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

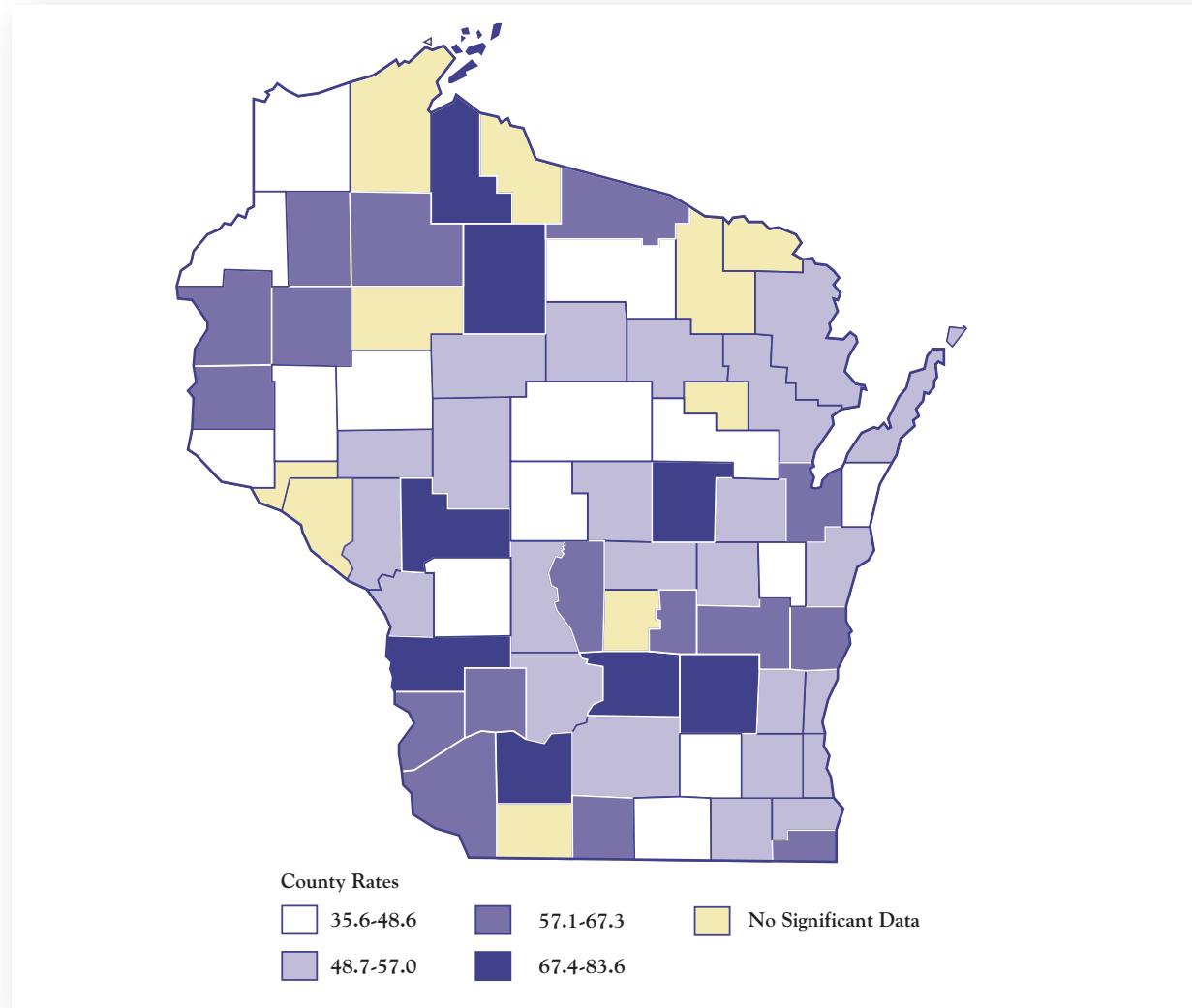
Source: Wisconsin Deaths, Bureau of Health Information and Policy, DPH, Wisconsin Department of Health and Family Services

Mortality (Deaths) by County – Stroke



**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		# Blacks		# Asian		# Am. Indian		# Hi-spanic	
	#	Rate	#	Rate	#	Rate	#	Rate	#	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