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# women at RISK!

## A PROFILE OF CARDIOVASCULAR DISEASE IN MICHIGAN

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## **FOR FURTHER INFORMATION, CONTACT:**

### **American Heart Association**

Midwest Affiliate  
2140 University Park Dr, Suite 210  
Okemos, MI 48864-4073  
(517) 349-3102

### **Cardiovascular Health, Nutrition and Physical Activity Section**

Division of Chronic Disease and Injury Control  
Department of Community Health  
2334 N. Martin Luther King, Jr. Blvd. P.O. Box 30195  
Lansing, MI 48909  
(517) 335-8374

### **Division of Epidemiology Services**

Bureau of Epidemiology  
Department of Community Health  
2334 N. Martin Luther King, Jr. Blvd.  
P.O. Box 30195  
Lansing, MI 48909



**American Heart Association**  
**1-800-AHA-USA1 (1-800-242-8721) or contact your nearest office.**  
**[americanheart.org](http://americanheart.org)**



**American Stroke Association**  
**1-888-4-STROKE (1-888-478-7653),**  
**[StrokeAssociation.org](http://StrokeAssociation.org)**



**Michigan Department of Community Health**  
**<http://www.michigan.gov>**



**Michigan Stroke Initiative**  
**<http://www.msu.edu/unit/epi/msi>**

**National Heart Lung and Blood Institute**  
**<http://www.nhlbi.nih.gov>**

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## A PROFILE OF CARDIOVASCULAR DISEASE IN MICHIGAN

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We are pleased to present “**Women at Risk: A Profile of Cardiovascular Disease in Michigan**”, a summary of the cardiovascular health of women in Michigan. Cardiovascular Disease (CVD) is the single leading cause of mortality and morbidity and a major contributor to healthcare costs in the United States and Michigan. *The American Heart Association 2002 Heart and Stroke Statistical Update*<sup>1</sup> reported that Michigan ranked number 41 worst among the 52 U.S. states and territories for overall age-adjusted CVD death rates during 1996-1998.

In 2000, 19,281 or 43% of deaths of Michigan women were due to CVD. There were 14,362 deaths due to diseases of the heart (DOH) and 3,535 deaths due to stroke – the first and third leading causes of death in Michigan. There were 73,292 hospital admissions or 6% of total admissions due to DOH and 20,111 admissions or 1.6% of total admissions due to stroke for Michigan women. Most of these deaths and much of the disability associated with CVD are directly associated with modifiable risk factors such as smoking, sedentary lifestyle, obesity and chronic diseases such as hypertension and diabetes that can often be controlled by diet, exercise and medication.

While cardiovascular deaths and hospitalizations increase dramatically with age, this is not just a disease of elderly women. In 2000, one in four deaths and almost 43% of hospitalizations were due to DOH and one in nine deaths and 30% of hospitalizations due to stroke occurred in women under 65 years of age. In general, African-Americans are disproportionately affected by CVD, have a higher prevalence of many risk factors and experience disease complications at an earlier age. The average age of hospitalization and death for DOH and stroke is approximately seven to eight years

earlier in African-American women compared to Caucasian women. Age-adjusted and age-specific mortality rates due to DOH and stroke are higher for all age groups except the most elderly for African-American women.

Michigan is at a particular disadvantage with a combination of high rates of CVD-related morbidity, mortality and high rates of unhealthy lifestyles. The Centers for Disease Control (<http://www.cdc.gov>) ranks Michigan among the top ten states for percentage of adults who smoke, are overweight or have high cholesterol or diabetes. Over 90% of Michigan women are estimated to have at least one modifiable risk factor, and 55% have two or more risk factors.

Michigan residents have a limited understanding of stroke. Responses to questions added to the 1999 *Michigan Behavioral Risk Factor Survey* to estimate the level of knowledge regarding risk factors and warning signs for stroke<sup>2</sup> indicated that 80% of respondents could identify at least one risk factor and only 28% were able to identify three. Hypertension, smoking, physical inactivity, and diet followed by high cholesterol and obesity, were most frequently mentioned. Sixty-nine percent reported at least one correct warning sign of stroke, but only 14% reported three. The most frequently reported signs were sudden weakness or numbness, sudden slurred speech, and disorientation or difficulty understanding. Knowledge of risk factors and warning signs varied among demographic groups and was poorest among those groups at the highest risk for stroke – the elderly (75 years and older), men, African-Americans and those with less education.

<sup>1</sup> American Heart Association. 2002 Heart and Stroke Statistical Update, Dallas, Tex.: American Heart Association; 2001.

<sup>2</sup> Reeves M. Hogan J. Rafferty A. Knowledge of Stroke Risk Factors and Warning Signs in Michigan Adults, *Neurology* (forthcoming).

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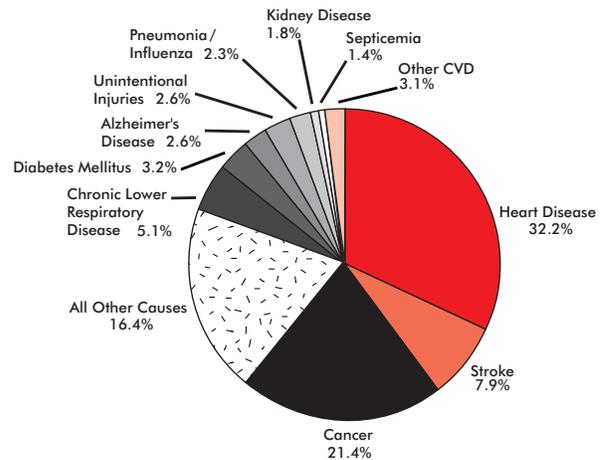
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# WOMEN AND CARDIOVASCULAR DISEASE IN MICHIGAN, 2000

In 2000, 41%, or 35,791 deaths, were directly attributable to cardiovascular disease (CVD), the single leading cause of death in Michigan. Women accounted for 53% of these CVD deaths (19,281). Figure 1 indicates that in 2000, 14,362 women died due to diseases of the heart (DOH) (33% of deaths), 3,535 due to stroke (8%) and 1,384 deaths to other forms of CVD (3%). Modifiable risk factors and treatment for hypertension, high cholesterol, diabetes and other known medical conditions associated with CVD are well documented, and treatment for these conditions has led to a significant decline in death rates in Michigan and the U.S. However, the decline in death rates for DOH and stroke, the first and third leading causes of death in Michigan, has slowed since the mid-1990s. Although death rates declined for both African-American and Caucasian women, racial disparities continue to exist, and rates for DOH and stroke remain higher for African-Americans. This report describes the extent of the problem of CVD for women in Michigan documenting time trends for mortality and presents data on race and age differences.

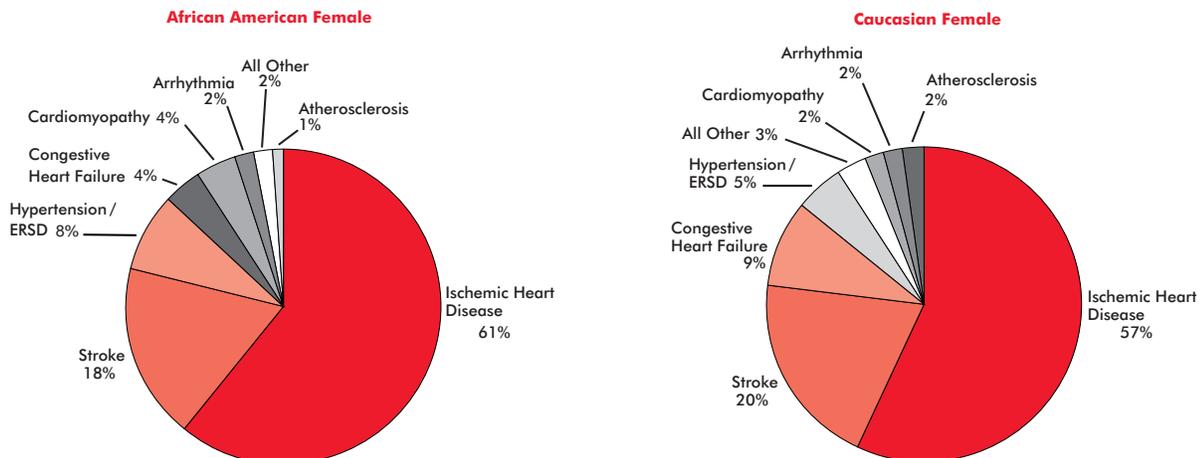


**FIGURE 1**  
Cause of Death, Michigan Females, 2000

In 2000, there were 16,687 deaths among Caucasian women, 2,476 in African-American women and 188 deaths among Asian/Pacific Islanders and Native American women attributed to CVD. Figure 2 displays the percent of cardiovascular deaths by the most common categories for African-American and Caucasian women; because of the very small numbers, data are not displayed for other racial groups. African-American women are more likely to die from

ischemic heart disease or coronary heart disease (61%), hypertensive heart disease and hypertension/end stage renal disease (ESRD) (8%) and cardiomyopathy (4%) than Caucasian women (57%, 5% and 2% respectively). In contrast, Caucasian women have a higher percentage of deaths due to stroke (20%) and congestive heart failure (9%) than African-American women (18% and 4%).

**FIGURE 2**  
Cardiovascular Deaths  
Percent by Subgroup, African-American and Caucasian Females, Michigan, 2000



## A PERSONAL STORY OF CARDIAC ARREST:

### CAROL BARGO'S DECISION TO GO TO THE MALL MAY HAVE SAVED HER LIFE

On September 5, 2000, Carol Bargo went shopping with her husband, daughter, and grandchild. It became a critical day in her life, but she cannot remember any of the details.

The Westland Mall in Westland, Michigan was crowded with families shopping for school clothes. Carol was 56 years old and in good health, and was feeling fine during the excursion. In fact, as a group, her family had decided to exit a door that was not near their vehicle in order to get some exercise. They had just opened the outer entrance when Carol collapsed, falling right outside the door.



Her family summoned a store employee who called security. Several security officers responded within one minute of the call. Carol was semi-conscious when security officers arrived, but moments later went into full cardiac arrest. In effect, her heart was fluttering in her chest and unable to pump blood. At this point, she had no pulse, her body was not sending oxygen to her brain, and death was imminent. When sudden cardiac arrest occurs, every minute becomes precious.

Cardiac arrest victims must receive defibrillation (an electric shock to restore the heart's normal rhythm) within 7 to 10 minutes. The chance of survival is reduced by 7-10 percent for each minute that passes, and few attempts at resuscitation are successful after 10 minutes. Nationally, only about 5 percent of cardiac arrest victims survive, often because CPR and defibrillation are provided too late to reverse cardiac arrest.

The responding officers acted quickly. They began CPR on Carol as an automated external defibrillator (AED) was attached. The AED recognized the chaotic heart rhythm and administered several shocks. Carol's breathing and heart rate returned within three minutes of the officer's arrival.

Today Carol has an implanted defibrillator that automatically monitors her heart. And she has now been able to see the birth of a grandchild she might never have met if the outcome that day had been different. She has repeatedly expressed her gratitude to the security staff at the Westland Mall and the Westland Fire Department for their role in saving her life. You see, the AED units that revived her had been donated to the mall by the fire department only months earlier. While the Westland Fire Department has excellent response times to all calls, the speed with which the AED was used certainly helped in Carol's recovery.

Her rescuers, including both Westland Mall officers and the Westland Fire Department, were honored at the American Heart Association's Heartsaver Day in February 2001. That day, Carol wrote a letter to her rescuers that begins:

*Words cannot express the gratitude I feel, and will always feel, for all of you...I am so thankful that God put all of you there, at the right place and time. I am a wife of 35 years, a mother of two, and a grandmother of four, and we will never forget what you have done for us. Every day is now a gift, and because of you, I am still here to enjoy them.*

## DISEASES OF THE HEART

Diseases of the Heart (DOH), the most common cause of death in Michigan and the U.S.,<sup>1</sup> is a major cause of hospitalization and disability. DOH groups several cardiac diseases: ischemic heart disease or coronary heart disease, rheumatic heart disease, hypertensive heart disease, diseases of the pulmonary circulation, heart failure, cardiomyopathy and dysrhythmias. In 2000, DOH was the most common cause of death for women in Michigan, responsible for 14,362 deaths. One in nine deaths occurred before age 65. Women with DOH accounted for 73,292 or 5.8% of total hospitalizations. Almost 30% were women under 65 years and 56% of admissions were women between 65-84. Caucasian women accounted for 83% and African-American women accounted for 16% of hospital admissions. Table 1 illustrates the striking racial differences in age at hospitalization and death, highlighting the increased burden of DOH for African-Americans at younger ages.

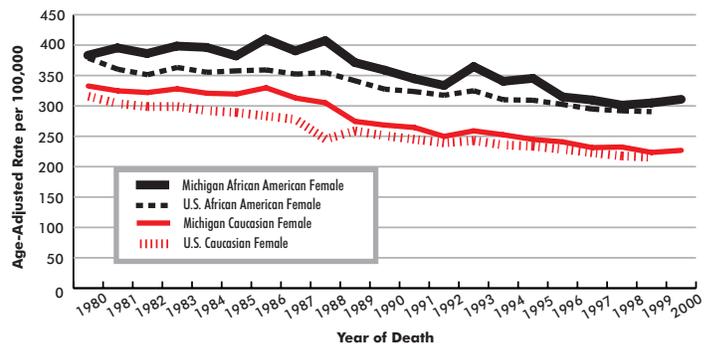
Although 12,388 or 86% of female deaths due to DOH were attributed to Caucasian women compared to African-American women (1,889), the age-adjusted rate is much higher for African-American females (310.8 versus 226.8/100,000). Age-adjusted rates (page 17) are standardized using a specific age distribution of a population to compare the burden of disease among groups. Figure 3 illustrates that age-adjusted rates for African-American and Caucasian women were higher in Michigan than in the U.S. although rates declined from 1980-2000. The decline for Michigan African-American women was -18.9% and -33.8% for Caucasian women. However the differences in age-adjusted rate for African-American and Caucasian women actually increased slightly during the time period. (1980, RR 1.2; 2000, RR 1.4 ).

For the most part, trends in race and age-specific mortality rates mirror the age-adjusted rates presented in Figure 4. However, rates are much higher at older ages, while racial differences are larger in younger age groups. There is wide variability in the rate of decline in mortality among the different age groups since 1980. Figure 4 illustrates the consistent declines in DOH mortality rates among 35-64 year old women between 1980 and 2000. Mortality rates decreased from 229.7 to 139.4/100,000 for African-American (-39%) and from 118.6 to 60.3/100,000 for Caucasian women (-49%). Declines in mortality rates for Caucasian women appear to have flattened since 1994, while those for African-American women have continued to decline. The largest disparities by race exist in this age group, although mortality rates are lowest.

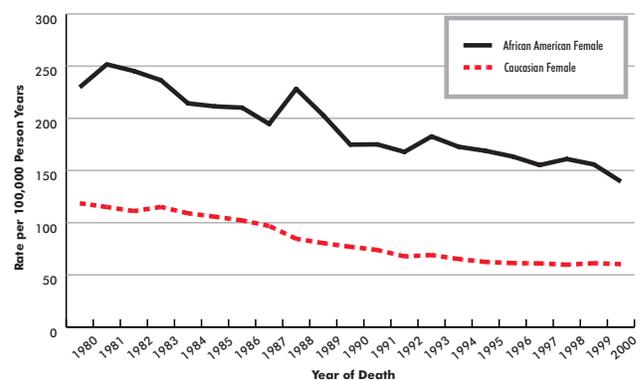
**Table 1**  
Average Age of Hospitalization and Death due to Diseases of the Heart, African-American and Caucasian Females, Michigan 2000

	Caucasian	African-American
Hospitalization	72.4	65.4
Death	81.9	74.8

**Figure 3**  
Age-Adjusted Mortality Rate due to Diseases of the Heart African-American and Caucasian Females, Michigan and the US, 1980- 2000



**Figure 4**  
Age-specific Mortality Rates due to Diseases of the Heart African-American and Caucasian Females, Ages 35 - 64 Michigan, 1980 - 2000



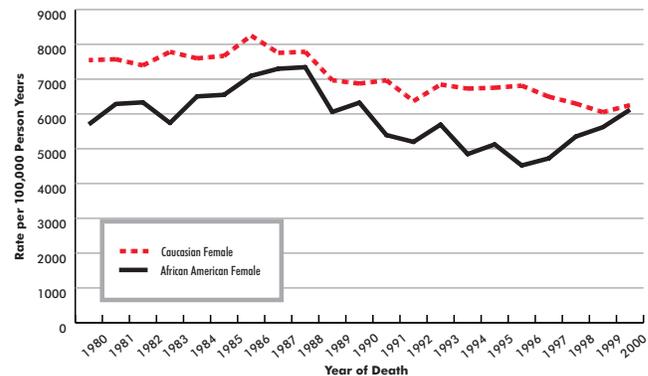
Overall trends for age-specific mortality rates due to DOH in 65-84 year olds are similar to those in the 35-64 age group, although differences in mortality by race are less pronounced. The absolute rate of mortality is much higher (1,000-1,700/100,000 in 2000) than the 35-64 year old group reflecting the increase in DOH following menopause. The overall decline of DOH mortality rates is less pronounced in this age group with rates decreasing from 1729.7 to 1382.7/100,000 for African-American (-20%) and from 1512.3 to 988.6 for Caucasian women (-34%).

As can be seen in Figure 5, mortality rates due to DOH are extremely high in the 85 and older age group (over 6,000/100,000 in 2000), and Caucasian rates are now higher than African-American rates. However, the trend in the decrease of DOH mortality rates was less pronounced for Caucasian women, and the rate for African-American women actually increased during the period to equal the rate for Caucasian women. Mortality rates increased from 5699.6 in 1980 to 6122.2/100,000 for African-American (7.4%) and decreased from 7545.6 to 6251.3/100,000 for Caucasian women (-17%). The increase in deaths due to DOH among African-American women reflects the increase in the number of African-American women living to older ages.

African-American females have a higher risk of dying from DOH than Caucasians, especially at younger ages. Only in the older group (85+) have the rates been higher in Caucasians. Table 2 illustrates that between 1980 and 2000 the risk of dying from DOH for African-American women increased in the youngest and oldest age groups, while rates in the 65-84 year old group have remained relatively stable.

Years of Potential Life Lost (YPLL) provides an estimate of the impact of dying before age 75. Figure 6 describes the absolute decline in YPLL for both African-American (-16.9%) and Caucasian women (-39.0%) between 1980 and 2000. It also illustrates the increase in the disparity between the rates for African-American compared to Caucasian women during the time period (1980 RR 1.7; 2000; RR 2.2).

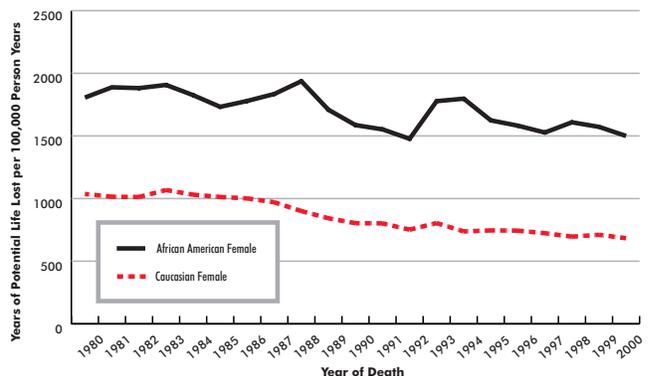
**Figure 5**  
Age-specific Mortality Rates due to Diseases of the Heart  
African-American and Caucasian Females, Ages 85 and older  
Michigan, 1980 - 2000



**Table 2**  
Relative Risk of Death due to Diseases of the Heart  
African-American versus Caucasian Females, Michigan 1980 and 2000

Age Group	45-64	65-84	Over 85
1980	1.9	1.1	0.8
2000	2.3	1.2	1.0

**Figure 6**  
Years of Potential Life Lost due to Premature Mortality  
Diseases of the Heart, African-American and Caucasian Females,  
Michigan, 1980 - 2000



<sup>1</sup> Minino AM, Smith BL. Deaths; Preliminary data for 2000. National vital statistics report; vol 49 no 12. Hyattsville, Maryland: National Center for Health Statistics, 2001

## A PERSONAL STORY OF CONGESTIVE HEART FAILURE:

### LIVING WITH CONGESTIVE HEART FAILURE

Gertrude Besteman was born in Grand Rapids, Michigan to a blue-collar family in 1911. Her father worked a variety of manual labor positions and her mother was a homemaker, taking care of Gert and her younger brother Mike. Gert caught a severe case of strep throat in the eighth grade, which led to rheumatic fever. That illness, which marked her last year of formal education, is the likely culprit behind Gert's development of congestive heart failure later in life.

Rheumatic fever, now treated with strong antibiotics, was more common and created far more damage for those affected in the early 1900's. The rheumatic heart disease that results from the fever can last for life. Eventually, the disease damages the heart valves and may cause serious, even disabling, problems. The most advanced condition is congestive heart failure (CHF), in which the heart enlarges and can't pump out all of its blood. Gert had congestive heart failure for many of her senior adult years.

As a young woman, Gert worked for years at Haskelite Products, creating veneered wood products used in the manufacturing of airplane wings during the war. Joining girlfriends on a trip to visit relatives up north, she met Christopher Besteman, a farmer in Rudyard, Michigan. A friend recalled in a letter how the boys of the family, including Chris, slept in the barn to free up the bedrooms in the house for the visiting women. The letter also notes that Chris and Gert talked while sitting in the rumble seat of a car until the scandalous hour of midnight!

Chris himself was often sick as a child after he fought a case of rheumatic fever. When he passed away at the age of 85, one of his brothers admitted that as a young man, they had concerns as to whether someone in Chris' health should marry, but after childhood, Chris enjoyed great health. As an adult, although very slight in build, he could out-work many other men.

Chris and Gert wed in 1942, and she joined him on the farm in Rudyard where two of their three children were born. In 1952, they returned to Grand Rapids where Chris worked in landscaping and as the custodian of West Leonard Christian Reformed Church.

Congestive heart failure lurked in the background of Gert's health issues. She thought she had just inherited her father's

puffy ankles, but now we know he also may have had CHF. Puffy ankles can be a symptom of CHF and are a signal that the heart is not pumping fluids as it should. At the same time, Gert had other risk factors for heart disease.

She struggled for years with her weight and lived a sedentary lifestyle. In her 60's she developed insulin-dependant diabetes. Diuretics controlled the fluids in her body that her heart could not pump, but she found them very unpleasant. One year, fluid built up around her lungs and caused shortness of breath, a common symptom of CHF. Her physician aspirated two quarts of fluid from the area.

Housework became more and more difficult, but now with just Gert and Chris at home, they would work as a team to finish the cleaning, cooking and even some canning. Gert confessed that climbing the basement stairs became so difficult during laundry days that she spent several hours in the basement during washday, listening to the radio and reading on a couch while the washing machine was going.

In spite of her health, Gert enjoyed visiting with their children, grandchildren and others from church. Chris developed a passion for agate rock hunting that would take them back to the Upper Peninsula and his family on frequent mini-trips. Their spiritual life became the center of their lives and they instilled those spiritual values in their children as well.

Chris' heart attack in 1998, and subsequent diagnosis of CHF, surprised his children who always thought him in much better health than Gert. He passed away that year with Gert following a year later from a stroke at the age of 88.

While there are many causes of CHF, modern antibiotic therapy has sharply reduced mortality from rheumatic fever. In 1950, about 15,000 Americans died of this disease, while rheumatic fever and rheumatic heart disease killed only 3,676 Americans in 1999.†



† Source: AHA 2000 Statistical update

## CORONARY HEART DISEASE AND OTHER DISEASES OF THE HEART

**Coronary heart disease (CHD)**, the most common form of DOH, is caused by atherosclerosis, the narrowing of the coronary arteries due to cholesterol and fatty build-ups of plaque. Atherosclerosis reduces blood supply to the heart and causes damage to the muscle, which can result in angina pectoris (chest pain), heart attack or both. In 2000, CHD was responsible for 20,413 or 23% of all deaths in Michigan. Women accounted for 50% or 10,248 CHD deaths, 91% of these women were over 65 years old. There were 87,017 hospitalizations due to CHD; 35% or 30,197 were women, and one-third were women under 65 years old. Hospitalizations occur at approximately age 65 for African-American women and age 70 for Caucasian women; deaths occur at age 77 for African-American women and age 82 for Caucasian women. Although 86% of female CHD deaths were attributed to Caucasian women, age specific rates and rate ratios are higher for African-American women.

**Congestive heart failure (CHF)** is a condition in which the heart can't pump enough blood to the body's other organs. This can result from coronary artery disease, past heart attack, high blood pressure, heart valve disease due to past rheumatic fever or other causes, primary disease of the heart muscle itself (cardiomyopathy), heart defects present at birth (congenital heart disease) or infection of the heart valves and/or heart muscle itself (endocarditis and/or myocarditis). As blood flow out of the heart slows, blood returning to the heart through the veins backs up, causing congestion in the tissues. Edema, or swelling, often results. Most often there's swelling in the legs and ankles, but it can happen in other parts of the body, too. Sometimes fluid collects in the lungs and interferes with breathing, causing shortness of breath, especially when a person is lying down. Heart failure also affects the kidneys' ability to dispose of sodium and water. The retained water increases the edema.

In 2000, CHF was responsible for 2,334 or 3% of deaths in Michigan. Sixty-four percent or 1,492 CHF deaths occurred in women and 95% were women over 65 years old. There were 37,183 hospitalizations due to CHF, and 54.4% or 20,257 were women, and almost 80% of these hospitalizations were women less than 65 years old.

**Table 3**  
Number of deaths, Age-Specific rates and Rate Ratios  
Coronary Heart Disease, African-American  
and Caucasian Females, Michigan, 2000

	Caucasian		African-American		Rate Ratio
	Number	Age-Specific rate	Number	Age-Specific rate	
Less than 65	688	19.4	229	33.6	1.7
Over 65	8085	1251.6	1185	1524.1	1.2

Hospitalizations occur at approximately age 67 for African-American women and age 76 for Caucasian women; deaths occur at age 79 for African-American women and age 85 for Caucasian women. Although 93% of female CHF deaths occur in Caucasian women, age specific rates are higher for African-American women less than 65 years, but the rate ratio less than 1 indicates this is a more serious problem for women over 65 years.

**Table 4**  
Number of deaths, Age-Specific rates and Rate Ratios  
Congestive Heart Failure, African-American and Caucasian  
Females, Michigan, 2000

	Caucasian		African-American		Rate Ratio
	Number	Age-Specific rate	Number	Age-Specific rate	
Less than 65	47	1.3	12	1.8	1.3
Over 65	1339	207.3	87	111.9	0.5

**Cardiomyopathy** is a serious disease in which the heart muscle becomes inflamed and may cause the heart to lose its ability to pump blood. There may be multiple causes including viral infections. Ischemic cardiomyopathy, the most common form of cardiovascular disease, refers to damage to the heart muscle resulting from coronary artery disease. Nonischemic cardiomyopathy includes dilated, hypertrophic and restrictive. Dilated cardiomyopathy, the most common nonischemic form, occurs when the heart cavity is enlarged and stretched (cardiac dilation). The heart is weak and doesn't pump normally, and most patients develop congestive heart failure. Abnormal heart rhythms called arrhythmias and disturbances in the heart's electrical conduction also may occur. Hypertrophic cardiomyopathy is a rare condition in which the muscle mass of the left ventricle enlarges or "hypertrophies." Some people have cardiac arrhythmias that may lead to sudden death. Restrictive cardiomyopathy is the least common type in the United States. The myocardium (heart muscle) of the ventricles becomes excessively "rigid," so it's harder for the ventricles to fill with blood between heartbeats.

In 2000, cardiomyopathy was responsible for 1,142 or 1% of deaths in Michigan; 43% or 493 deaths occurred in women, and 69% were women over 65 years old. There were 753 hospitalizations due to cardiomyopathy, and 43% were women; 31% were women less than 65 years old. Hospitalizations occur at approximately age 52 for African-American women and age 59 for Caucasian women; deaths occur at age 58 for African-American women and age 75 for Caucasian women. Although 78% of cardiomyopathy female deaths occur in Caucasian women, age specific rates are higher for African-American women. Sixty-one percent of African-American deaths occur before age 65, and the racial discrepancy is very large for that age group (RR 3.8) reflecting the greater problem for younger African-American women.

**Table 5**  
**Number of deaths, Age-Specific rates and Rate Ratios Cardiomyopathy, African-American and Caucasian Females, Michigan, 2000**

	Caucasian		African-American		Rate Ratio
	Number	Age-Specific rate	Number	Age-Specific rate	
Less than 65	87	4.7	63	16.8	3.8
Over 65	299	74.3	41	86.4	1.1

**Hypertension**, or high blood pressure, is defined in an adult as a systolic pressure of 140 mm Hg or higher and/or a diastolic pressure of 90 mm Hg or higher. Blood pressure results from two forces. Systolic pressure is created by the heart as it pumps blood into the arteries and through the circulatory system. Diastolic pressure is the pressure during the resting phase of the heart when the arteries resist the blood flow. Hypertension directly increases the risk of coronary heart disease and stroke, especially when accompanied by other risk factors. Blood pressure of less than 140 over 90 is considered a normal reading for adults. A systolic pressure of 130 to 139 or a diastolic pressure of 85 to 89 needs to be watched carefully, and it is desirable to have blood pressure readings around 120 systolic/80 diastolic. Goal blood pressure levels may vary if other diseases are present such as diabetes or kidney disease. Blood pressure readings consistently at 140 systolic and/or 90 diastolic or higher are considered elevated or high.

In 2000, hypertension/ESRD was responsible for 1,620 or 2% of deaths in Michigan; 62% or 998 deaths occurred in women, and 89% were women over 65 years old. There were 10,939 hospitalizations due to hypertension/ESRD; and 57% were women, and almost 36% of these hospitalizations were women less than 65 years old. Hospitalizations occur at approximately age 61 for African-American women and age 72 for Caucasian women; deaths occur at age 73 for African-American women and age 83 for Caucasian women. Although 81% of hypertension/ESRD female deaths occur in Caucasian women, age specific rates are higher for African-American women especially for ages less than 65.

**Table 6**  
**Number of deaths, Age-Specific rates and Rate Ratios Hypertension/End Stage Renal Disease, African-American and Caucasian Females, Michigan, 2000**

	Caucasian		African-American		Rate Ratio
	Number	Age-Specific rate	Number	Age-Specific rate	
Less than 65	54	1.5	50	7.3	4.8
Over 65	759	117.5	128	1.4	1.4

Hypertension damages the heart muscle and kidneys increasing the chances of stroke and is a major cause of left ventricular failure. Systolic pressure increases with age and isolated systolic hypertension is a major risk factor for stroke, heart attack, kidney damage, blindness and other conditions. Elevated diastolic pressure is an important risk factor for heart attack, stroke and renal failure at younger ages. End Stage Renal Disease (ESRD) is the reduction in the number of functioning nephrons resulting in sodium and water retention.

## A PERSONAL STORY OF STROKE:

### A ROLLING NIGHTMARE— DRIVING AN 18-WHEELER AND HAVING A STROKE!

In October 1998, veteran truck driver Jackie Oder and her dachshund, Cricket, had just off-loaded a shipment in Goshen, Indiana. In her late seventies, Jackie was feeling good and looking forward to a relaxing evening drive back to her Cedar Springs, Michigan home. Without warning, her right hand fell away from the steering wheel and went numb. Then, the ride side of her body followed, limp as a rag, her right foot struggling for control of the brake pedal. "I didn't have time to get scared," recalls Jackie, "I got on the CB radio and said 'I'm having a stroke. This is the Flying Lady.'" She was able to stop the rig on the side of the highway. Another driver responded that help was on the way.

An ambulance crew at a truck stop just two miles away responded immediately. By the time they reached her, Jackie's right side was paralyzed. The EMT team and a passing Michigan State Patrolman cut off her seat belt and, after taking vitals, slid her out of the tall semi and rushed her to Spectrum Health in Grand Rapids. At this point, she was blind, but could talk, and panicked when she was asked her name. She couldn't remember.

At Spectrum Health, a battery of tests were run and medications were started. They discovered a blood clot in her brain and administered tissue plasminogen activator (tPA), a drug used for cardiac patients, but not yet common for treating stroke patients. Jackie knew there were risks involved with this treatment but gave her consent. That decision on Friday morning to go ahead with tPA was a turning point in her life. For Jackie the drug was a success. She began to regain her motor skills within hours.

By the next day, she faced her first challenge — eating. Her doctor was in the room at the time. Jackie was going to will herself to regain control of her abilities. She flipped the fork and unfortunately, hit her doctor. He laughed and said, "You're going to be ALL RIGHT!" Slowly her vision returned. That Sunday night, she navigated the 8-10 steps to the bathroom. "I wasn't about to use a bedpan," Jackie says. By Monday, she was walking Spectrum's halls. She was discharged nearly fully recovered by Thursday afternoon. Her doctors felt that they should send her to a nursing home for a short time to have their physical therapist examine her again. Jackie however, felt so good that she was pushing other patients around the halls. She was determined to get behind the wheel of "The Big Lady," her tractor-trailer once again.

*"That was my first concern," recalls Jackie. "I knew the truck stop would take care of my rig, and a friend had taken my dachshund to her home. I was fortunate that help was there quickly. I was one of the first in the area to receive tPA for stroke. As a truck driver, I've learned not to panic and to have determination – you have to get your loads to their destination on time. I've applied those same qualities to my recovery from stroke. I exercise and eat healthy. I watch my blood pressure, cholesterol and triglycerides. I've kept my promise to "The Big Lady." Since the stroke, my motto has been: "Let's get this show on the road."*

\* These photos show Jackie as a professional driver in the 1960's and in 2001 after her stroke.



# STROKE

Stroke is the third leading cause of death in Michigan and the U.S. and a leading cause of disability. Stroke occurs when a blood vessel bringing oxygen and nutrients to the brain bursts or is clogged by a blood clot or other particle. Because of this rupture or blockage, part of the brain doesn't get the blood and oxygen it needs. Deprived of oxygen, nerve cells in the affected area of the brain can't work and die within minutes. The part of the body controlled by those nerve cells cannot function properly. The devastating effects of stroke are often permanent because dead brain cells are not replaced. Ischemic stroke, 70-80% of all strokes, is caused by a clot or other blockage in an artery supplying blood to the brain. Hemorrhagic stroke, caused by ruptured blood vessels, has a much higher fatality rate and tends to occur in younger age groups.

In 2000, stroke was the third most common cause of death for women in Michigan, responsible for 3,535 or 61% of all stroke deaths in Michigan. Nine percent of these deaths were in women less than 65 years old. Women with stroke accounted for 20,111 or 1.6% of total hospitalizations. One in four stroke admissions were women less than 65 years of age, and 57% of admissions occurred in women between 65 and 84 years. Eighty-three percent were Caucasian women and 15% African-American women. Table 7 illustrates the striking racial differences in the average age of hospitalization and death due to stroke.

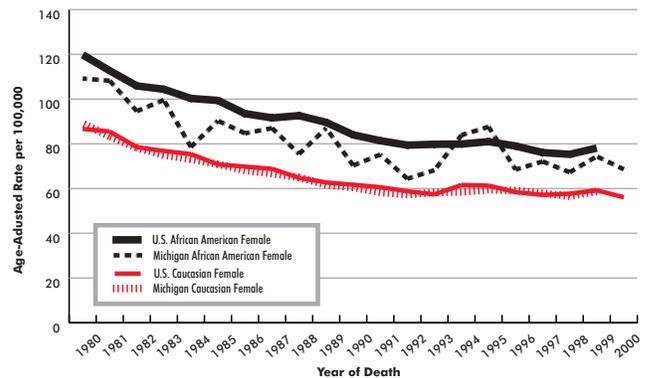
Although 87% of female deaths due to stroke occur in Caucasian women, the age-adjusted rate is much higher for African-American females (68.6 versus 56.1/100,000). Age-adjustment modifies the calculation of death rates to reflect the age distribution of the population to a standard population (page 17) so that a comparison of the burden of the disease between groups can be made. Trends in age-adjusted rates for Caucasian women were almost equal in Michigan and the U.S., while rates for African-American women were lower in Michigan than the U.S. during the time period. Figure 7 illustrates the dramatic decline in age-adjusted mortality rates for African-American (-37.2%) and Caucasian women (-35.3%) from 1980 and 2000. The differences in age-adjusted rate for African-American and Caucasian women remained stable (RR, 1.1) during the time period.

For the most part, trends in race and age-specific mortality rates mirror the age-adjusted rates presented in Figure 7. However rates are much higher at older ages while racial differences are larger in younger age groups. There is wide variability in the rate of decline in mortality among the different age groups since 1980. Figure 8 illustrates the consistent declines in stroke mortality rates among 35-64, and 65-74 year old women between 1980 and 2000. Mortality rates declined for 35-64 year old African-American (-37%) and Caucasian women (-47%) and for the 65-74 year old group (55% and 44% respectively). Declines in rates for Caucasian women in both age groups and for 35-64 year old African-American women appear to have flattened since 1994 whereas the rate for African-American women age 65-74 continued to decline. Rates increase rapidly with increasing age. Rates tripled for African-American women and increased fivefold for Caucasian women between age 45-64 and age 65-74.

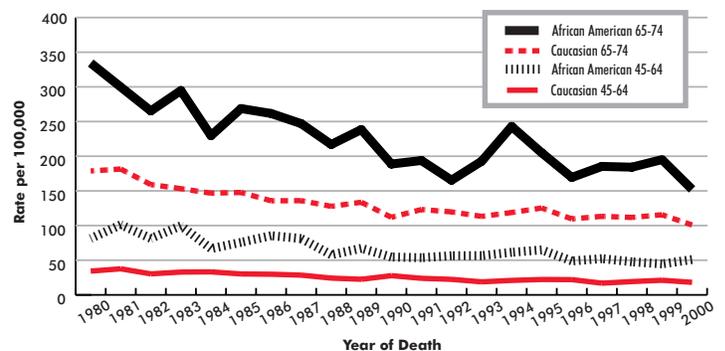
**Table 7**  
Average Age of Hospitalization and Death due to Stroke, African-American and Caucasian Females, Michigan 2000

	Caucasian	African-American
Hospitalization	73.8	65.9
Death	82.3	74.8

**Figure 7**  
Age-specific Mortality Rates due to Stroke African-American and Caucasian Females, Michigan, 1980 - 2000

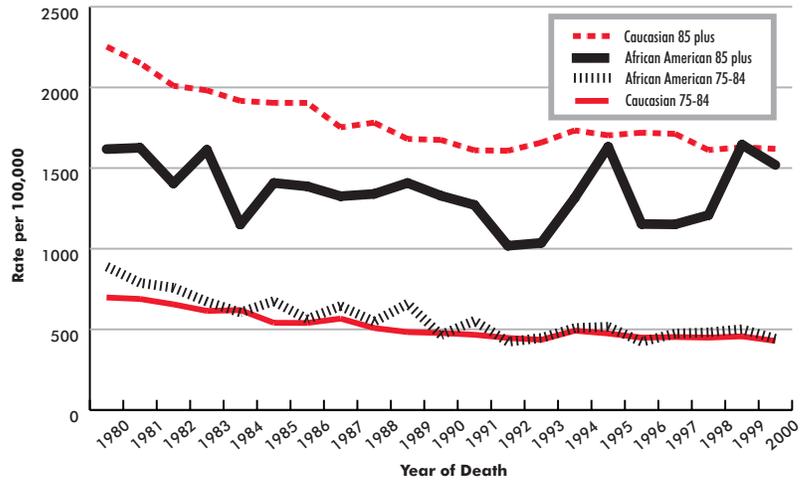


**Figure 8**  
Age-specific Mortality Rates due to Stroke African-American and Caucasian Females, Ages 45-74 Michigan, 1980 - 2000



As can be seen in Figure 9, rates for the 75-84 year old age group are three to four times higher than the younger age group. The trend lines begin to converge with African-American rates declining more rapidly (-50%) than those of Caucasian women (-39%). However, mortality rates due to stroke are extremely high in the 85 and older age group (over 1,600/100,000 in 2000), and the decrease in stroke mortality rates is less pronounced for African-American (-6%) than Caucasian women (-28.1%). There was an increase in the total number of deaths due to stroke for this age group reflecting the increase in women living to older ages.

**Figure 9**  
Age-specific Mortality Rates due to Stroke African-American and Caucasian Females, Ages 75 - 84 and 85 and older Michigan, 1980 - 2000



**Racial Differences in Mortality**

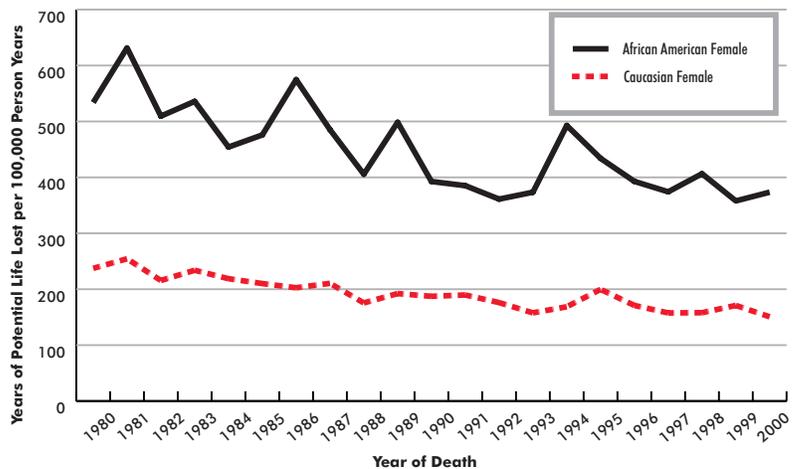
African-American females have a higher risk of dying from stroke than Caucasians at younger ages. Only in the oldest group (85+) have the rates been higher in Caucasian women. Table 8 illustrates that between 1980 and 2000 the risk of dying from stroke for African-American women increased in the youngest age group and oldest age groups, while age groups between 65-85 years decreased slightly.

**Table 8**  
Relative Risk of Death due to Stroke, African-American versus Caucasian Females, Michigan, 1980 - 1990 - 2000

Age Group	45-64	65-74	75-84	Over 85
1990	2.4	1.9	1.3	0.7
2000	2.8	1.5	1.0	0.9

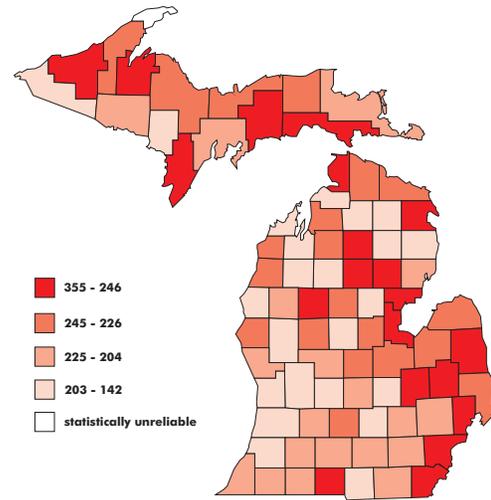
Years of Potential Life Lost (YPLL) provides an estimate of the impact of dying before age 75. Figure 10 describes the absolute decline in YPLL for both African-American (-30.0%) and Caucasian women (-36.5%) between 1980 and 2000. It also illustrates the increase in the disparity between the rates of YPLL for African-American compared to Caucasian women (1980 RR 2.2; 2000; RR 2.5).

**Figure 10**  
Years of Potential Life Lost due to Premature Mortality due to Stroke, African-American and Caucasian Females, Michigan, 1980 - 2000



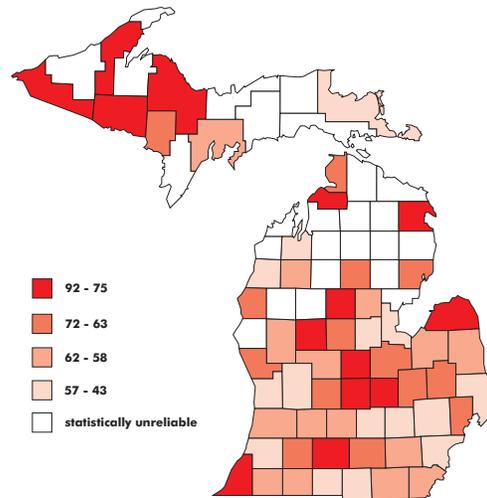
## DISEASES OF THE HEART AND STROKE RATES BY COUNTY

Age-adjusted mortality rates due to DOH by county for Michigan females ranged from 82.0 - 354.9/100,000 population for 1999-2000. The average rate for the state was 235.0/100,000 population. Only one county located in the Upper Peninsula had very small numbers of deaths resulting in a statistically unreliable rate. Counties with the highest rates were mainly located throughout the Upper Peninsula and in the eastern region of the lower Peninsula.



**Figure 11**  
Age-adjusted Mortality Rates for Diseases of the Heart by County, Michigan 1999 and 2000

Age-adjusted stroke mortality rates by county for Michigan females ranged from 42.7 - 93.2/100,000 population for 1999-2000. The average rate for the state was 59.4/100,000 population. Unlike DOH, rates were not calculated for 25 counties mainly located in the Upper Peninsula and the northern portion of the lower peninsula because of very small numbers of deaths. Counties with the highest rates were found in the western portion of the Upper Peninsula and the middle region of the state. It is important to note that these rates, which aggregate deaths for all females, are mainly reflective of deaths to Caucasian women.



**Figure 12**  
Age-adjusted Mortality Rates for Stroke by County, Michigan 1999 and 2000

Age-adjusted rates are computed by the direct method using the Year 2000 population as the standard.

## RISK FACTORS FOR CARDIOVASCULAR DISEASE

Many of the modifiable and non-modifiable risk factors for cardiovascular disease (CVD) are known. Non-modifiable risk factors include increasing age, male gender and family history of diseases of the heart and stroke, especially at younger ages<sup>1</sup>. Modifiable risk factors include cigarette smoking, obesity, physical inactivity, hypertension, high cholesterol, and diabetes.

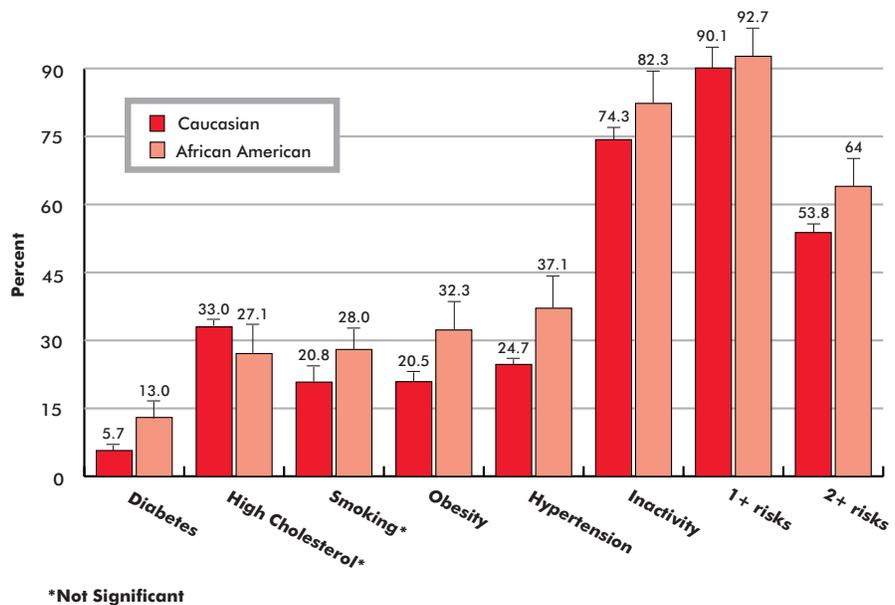
Other factors that may contribute to the risk of heart disease and stroke in women include menopause and estrogen loss, use of birth control pills, particularly in women who smoke or have hypertension, high triglyceride levels, excessive alcohol intake and individual response to stress. Many CVD related deaths may be prevented by educating people about lifestyle changes needed to reduce risk factors crucial to prevent the onset of CVD.

While improvements in the control of known medical risk factors have led to a significant decline in death rates, hypertension, smoking and high cholesterol rates remain high, and the prevalence of obesity continues to increase<sup>2</sup>. Hypertension is

believed to contribute to 26% of strokes and 25% of DOH deaths while cigarette smoking contributes 12% and stroke 22% to DOH deaths. High cholesterol is a major contributor to DOH deaths (43%), and obesity is thought to contribute approximately 20% to stroke and DOH deaths.

Michigan monitors modifiable risk factors using the Behavioral Risk Factor System which is designed to provide population-level estimates of health behavior characteristics, attitudes, knowledge and awareness. Results displayed in Figure 13 of the 1999 and 2000 Michigan survey indicate that over 90% of Michigan women are estimated to have at least one potentially modifiable risk factor for CVD, and almost 65% of African-American and 54% of Caucasian women have two or more risk factors. African-American women had higher rates of each of these risk factors except for high cholesterol. The differences were significant for diabetes, obesity, hypertension and inactivity.

**Figure 13**  
Prevalence of Risk Factors for Cardiovascular Disease, African-American and Caucasian Females, Michigan Behavioral Risk Factor Survey, 1999 and 2000



<sup>1</sup>Newschaffer CJ, Brownson BA, Dusenbury LJ. 1998. Cardiovascular Disease. In Brownson RC, Remington PL, Davis J Red. Chronic Disease Epidemiology and Control. 2nd ED. Washington, DC. American Public Health Association.

<sup>2</sup>National Institutes of Health, National Heart, Lung and Blood Institute, 2002. Morbidity and Mortality; 1998 Chartbook on Cardiovascular, Lung and Blood Diseases.

**Table 9****Guide to Primary Prevention of Cardiovascular Disease and Stroke: Risk Intervention**

This table was originally published in *Circulation: Journal of the American Heart Association*<sup>1</sup>

RISK INTERVENTION AND GOALS	RECOMMENDATIONS
<b>Smoking</b> Goal: Complete cessation. No exposure to environmental tobacco smoke.	Ask about tobacco use status at every visit. In a clear, strong, and personalized manner, advise every tobacco user to quit. Assess the tobacco user's willingness to quit. Assist by counseling and developing a plan for quitting. Arrange follow-up, referral to special programs, or pharmacotherapy. Urge avoidance of exposure to secondhand smoke at work or home.
<b>BP control</b> Goal: <140/90 mm Hg; <130/85 mm Hg if renal insufficiency or heart failure is present; or <130/80 mm Hg if diabetes is present.	Promote healthy lifestyle modification. Advocate weight reduction; reduction of sodium intake; consumption of fruits, vegetables, and low-fat dairy products; moderation of alcohol intake; and physical activity in persons with BP of $\geq 130$ mm Hg systolic or 80 mm Hg diastolic. For persons with renal insufficiency or heart failure, initiate drug therapy if BP is $\geq 130$ mm Hg systolic or 85 mm Hg diastolic ( $\geq 80$ mm Hg diastolic for patients with diabetes). Initiate drug therapy for those with BP $\geq 140/90$ mm Hg if 6 to 12 months of lifestyle modification is not effective, depending on the number of risk factors present. Add BP medications, individualized to other patient requirements and characteristics (eg, age, race, need for drugs with specific benefits).
<b>Dietary intake</b> Goal: An overall healthy eating pattern.	Advocate consumption of a variety of fruits, vegetables, grains, low-fat or nonfat dairy products, fish, legumes, poultry, and lean meats. Match energy intake with energy needs and make appropriate changes to achieve weight loss when indicated. Modify food choices to reduce saturated fats (<10% of calories), cholesterol (<300 mg/d), and trans-fatty acids by substituting grains and unsaturated fatty acids from fish, vegetables, legumes, and nuts. Limit salt intake to <6 g/d. Limit alcohol intake ( $\leq 2$ drinks/d in men, $\leq 1$ drink/d in women) among those who drink.
<b>Aspirin</b> Goal: Low-dose aspirin in persons at higher CHD risk (especially those with 10-y risk of CHD $\geq 10\%$ ).	Do not recommend for patients with aspirin intolerance. Low-dose aspirin increases risk for gastrointestinal bleeding and hemorrhagic stroke. Do not use in persons at increased risk for these diseases. Benefits of cardiovascular risk reduction outweigh these risks in most patients at higher coronary risk. Doses of 75-160 mg/d are as effective as higher doses. Therefore, consider 75-160 mg aspirin per day for persons at higher risk (especially those with 10-y risk of CHD of $\geq 10\%$ ).
<b>Blood lipid management</b> Primary goal: LDL-C <160 mg/dL if $\leq 1$ risk factor is present; LDL-C <130 mg/dL if $\geq 2$ risk factors are present and 10-y CHD risk is <20%; or LDL-C <100 mg/dL if $\geq 2$ risk factors are present and 10-y CHD risk is $\geq 20\%$ or if patient has diabetes. Secondary goals (if LDL-C is at goal range): If triglycerides are >200 mg/dL, then use non-HDL-C as a secondary goal: non-HDL-C <190 mg/dL for $\leq 1$ risk factor; non-HDL-C <160 mg/dL for $\geq 2$ risk factors and 10-y CHD risk $\leq 20\%$ ; non-HDL-C <130 mg/dL for diabetics or for $\geq 2$ risk factors and 10-y CHD risk >20%. Other targets for therapy: triglycerides >150 mg/dL; HDL-C <40 mg/dL in men and <50 mg/dL in women.	If LDL-C is above goal range, initiate additional therapeutic lifestyle changes consisting of dietary modifications to lower LDL-C: <7% of calories from saturated fat, cholesterol <200 mg/d, and, if further LDL-C lowering is required, dietary options (plant stanols/sterols not to exceed 2 g/d and/or increased viscous [soluble] fiber [10-25 g/d]), and additional emphasis on weight reduction and physical activity. If LDL-C is above goal range, rule out secondary causes (liver function test, thyroid-stimulating hormone level, urinalysis). After 12 weeks of therapeutic lifestyle change consider LDL-lowering drug therapy if: $\geq 2$ risk factors are present, 10-y risk is >10%, and LDL-C is $\geq 130$ mg/dL; $\geq 2$ risk factors are present, 10-y risk is <10%, and LDL-C is $\geq 160$ mg/dL; or $\leq 1$ risk factor is present and LDL-C is $\geq 190$ mg/dL. Start drugs and advance dose to bring LDL-C to goal range, usually a statin but also consider bile acid-binding resin or niacin. If LDL-C goal not achieved, consider combination therapy (statin + resin, statin + niacin). After LDL-C goal has been reached, consider triglyceride level: If 150-199 mg/dL, treat with therapeutic lifestyle changes. If 200-499 mg/dL, treat elevated non-HDL-C with therapeutic lifestyle changes and, if necessary, consider higher doses of statin or adding niacin or fibrate. If >500 mg/dL, treat with fibrate or niacin to reduce risk of pancreatitis. If HDL-C is <40 mg/dL in men and <50 mg/dL in women, initiate or intensify therapeutic lifestyle changes. For higher-risk patients, consider drugs that raise HDL-C (eg, niacin, fibrates, statins).

BP indicates blood pressure; CHD, coronary heart disease; LDL-C low-density lipoprotein cholesterol; HDL-C, high-density lipoprotein cholesterol; and INR, international normalized ratio.

<sup>1</sup> Pearson T, Blair S, Daniels S et al, AHA Scientific Statement: AHA Guidelines for Primary Prevention of Cardiovascular Disease and Stroke: 2002 Update. *Circulation*. 2002;106:388-391.

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**RISK INTERVENTION AND GOALS****RECOMMENDATIONS**

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**Physical activity**

Goal: At least 30 min of moderate-intensity physical activity on most (and preferably all) days of the week.

If cardiovascular, respiratory, metabolic, orthopedic, or neurological disorders are suspected, or if patient is middle-aged or older and is sedentary, consult physician before initiating vigorous exercise program. Moderate-intensity activities (40% to 60% of maximum capacity) are equivalent to a brisk walk (15-20 min per mile). Additional benefits are gained from vigorous-intensity activity (>60% of maximum capacity) for 20-40 min on 3-5 d/wk. Recommend resistance training with 8-10 different exercises, 1-2 sets per exercise, and 10-15 repetitions at moderate intensity  $\geq 2$  d/wk. Flexibility training and an increase in daily lifestyle activities should complement this regimen.

**Weight management**

Goal: Achieve and maintain desirable weight (body mass index 18.5-24.9  $\text{kg}/\text{m}^2$ ). When body mass index is  $\geq 25$   $\text{kg}/\text{m}^2$ , waist circumference at iliac crest level <40 inches in men, <35 inches in women.

Initiate weight-management program through caloric restriction and increased caloric expenditure as appropriate. For overweight/obese persons, reduce body weight by 10% in first year of therapy.

**Diabetes management**

Goals: Normal fasting plasma glucose (<110 mg/dL) and near normal HbA1c (<7%).

Initiate appropriate hypoglycemic therapy to achieve near-normal fasting plasma glucose or as indicated by near-normal HbA1c. First step is diet and exercise. Second-step therapy is usually oral hypoglycemic drugs: sulfonylureas and /or metformin with ancillary use of acarbose and thiazolidinediones. Third-step therapy is insulin. Treat other risk factors more aggressively (eg, change BP goal to <130/80 mm Hg and LDL-C goal to <100 mg/dL).

**Chronic atrial fibrillation**

Goals: Normal sinus rhythm or, if chronic atrial fibrillation is present, anticoagulation with INR 2.0-3.0 (target 2.5).

Irregular pulse should be verified by an electrocardiogram. Conversion of appropriate individuals to normal sinus rhythm. For patients in chronic or intermittent atrial fibrillation, use warfarin anticoagulants to INR 2.0-3.0 (target 2.5) Aspirin (325 mg/d) can be used as an alternative in those with certain contraindications to oral anticoagulation. Patients <65 y of age without high risk may be treated with aspirin.

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**Table 10****AHA/ACC Secondary Prevention for Patients With Coronary and Other Vascular Disease: 2001 Update.**

This table was originally published in *Circulation:Journal of the American Heart Association*<sup>1</sup>

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**GOALS****INTERVENTION RECOMMENDATIONS**

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**Smoking:**

Goal  
Complete cessation.

Assess tobacco use. Strongly encourage patient and family to stop smoking and to avoid secondhand smoke. Provide counseling, pharmacological therapy, including nicotine replacement and bupropion, and formal smoking cessation programs as appropriate.

**BP control:**

Goal  
<140/90 mm Hg or <130/85 mm Hg if renal insufficiency or heart failure <130/80 mm Hg if diabetes

Initiate lifestyle modification (weight control, physical activity, alcohol moderation, moderate sodium restriction, and emphasis on fruits, vegetables, and low-fat dairy products) in all patients with BP of  $\geq 130$  mm Hg systolic or 80 mm Hg diastolic. Add blood pressure medication, individualized to other patient requirements and characteristics (i.e., age, race, need for drugs with specific benefits) if blood pressure is not <140 mm Hg systolic or 90 mm Hg diastolic or if blood pressure is not <130 mm Hg systolic or 85 mm Hg diastolic for individuals with heart failure or renal insufficiency (<80 mm Hg diastolic for patients with diabetes).

**Table 10 continued**

GOALS	INTERVENTION RECOMMENDATIONS			
<b>Lipid management:</b> <u>Primary goal</u> LDL < 100 mg/dL	<p>Start dietary therapy in all patients (&lt;7% saturated fat and &lt;200 mg/d cholesterol) and promote physical activity and weight management. Encourage increased consumption of omega-3 fatty acids. Assess fasting lipid profile in all patients, and within 24 hr of hospitalization for those with an acute event. If patients are hospitalized, consider adding drug therapy on discharge. Add drug therapy according to the following guide:</p> <table border="1" data-bbox="548 466 1455 779"> <thead> <tr> <th data-bbox="548 466 841 653">LDL &lt; 100 mg/dL (baseline or on-treatment) Further LDL-lowering therapy not required Consider fibrate or niacin (if low HDL or high TG)</th> <th data-bbox="857 466 1166 779">LDL 100-129 mg/dL (baseline or on-treatment) Therapeutic options: Intensify LDL-lowering therapy (statin or resin*) Fibrate or niacin (if low HDL or high TG) Consider combined drug therapy (statin + fibrate or niacin) (if low HDL or high TG)</th> <th data-bbox="1182 466 1455 653">LDL &gt; 130 mg/dL (baseline or on-treatment) Intensify LDL-lowering therapy (statin or resin*) Add or increase drug therapy with lifestyle therapies</th> </tr> </thead> </table>	LDL < 100 mg/dL (baseline or on-treatment) Further LDL-lowering therapy not required Consider fibrate or niacin (if low HDL or high TG)	LDL 100-129 mg/dL (baseline or on-treatment) Therapeutic options: Intensify LDL-lowering therapy (statin or resin*) Fibrate or niacin (if low HDL or high TG) Consider combined drug therapy (statin + fibrate or niacin) (if low HDL or high TG)	LDL > 130 mg/dL (baseline or on-treatment) Intensify LDL-lowering therapy (statin or resin*) Add or increase drug therapy with lifestyle therapies
LDL < 100 mg/dL (baseline or on-treatment) Further LDL-lowering therapy not required Consider fibrate or niacin (if low HDL or high TG)	LDL 100-129 mg/dL (baseline or on-treatment) Therapeutic options: Intensify LDL-lowering therapy (statin or resin*) Fibrate or niacin (if low HDL or high TG) Consider combined drug therapy (statin + fibrate or niacin) (if low HDL or high TG)	LDL > 130 mg/dL (baseline or on-treatment) Intensify LDL-lowering therapy (statin or resin*) Add or increase drug therapy with lifestyle therapies		
<b>Lipid Management:</b> <u>Secondary goal</u> If TG ≥ 200 mg/dL, then non-HDL+ < 130 mg/dL	<p>If TG ≥ 150 mg/dL or HDL &lt; 40 mg/dL: Emphasize weight management and physical activity. Advise smoking cessation. If TG 200-499 mg/dL: Consider fibrate or niacin after LDL-lowering therapy* If TG &gt; 500 mg/dL: Consider fibrate or niacin before LDL-lowering therapy* Consider omega-3 fatty acids as adjunct for high TG</p>			
<b>Physical activity:</b> <u>Minimum goal</u> 30 minutes 3 to 4 days per week <u>Optimal</u> daily	<p>Assess risk, preferable with exercise test, to guide prescription. Encourage minimum of 30 to 60 minutes of activity, preferably daily, or at least 3 or 4 times weekly (walking, jogging, cycling, or other aerobic activity) supplemented by an increase in daily lifestyle activities (e.g., walking breaks at work, gardening, household work). Advise medically supervised programs for moderate- to high-risk patients.</p>			
<b>Weight management:</b> <u>Goal</u> BMI 18.5-24.9 kg/m <sup>2</sup>	<p>Calculate BMI and measure waist circumference as part of evaluation. Monitor response of BMI and waist circumference to therapy. Start weight management and physical activity as appropriate. Desirable BMI range is 18.5-24.9 kg/m<sup>2</sup>. When BMI ≥ 25 kg/m<sup>2</sup>, goal for waist circumference ≤ 40 inches in men, ≤ 35 inches in women.</p>			
<b>Diabetes management:</b> Goal HbA1c < 7%	<p>Appropriate hypoglycemic therapy to achieve near-normal fasting plasma glucose, as indicated HbA1c Treatment of other risk factors (e.g., physical activity, weight management, blood pressure, and cholesterol management).</p>			
<b>Antiplatelet agents/anticoagulants:</b>	<p>Start and continue indefinitely aspirin 75-325 mg/d if not contraindicated. Consider clopidogrel 75 mg/d or warfarin if aspirin contraindicated. Manage warfarin to international normalized ratio = 2.0 to 3.0 in post-MI patients when clinically indicated or for those not able to take aspirin or clopidogrel.</p>			
<b>ACE inhibitors:</b>	<p>Treat all patients indefinitely post MI; start early in stable high-risk patients (anterior MI, previous MI, Killip class II [S<sub>3</sub> gallop, rales, radiographic CHF]). Consider chronic therapy for all other patients with coronary or other vascular disease unless contraindicated.</p>			
<b>B-Blockers:</b>	<p>Start in all post-MI and acute ischemic syndrome patients. Continue indefinitely. Observe usual contraindications. Use as needed to manage angina, rhythm, or blood pressure in all other patients.</p>			

BP indicates blood pressure; TG, triglycerides; BMI, body mass index; HbA1c, major fraction of adult hemoglobin; MI, myocardial infarction; and CHF, congestive heart failure.

\*The use of resin is relatively contraindicated when TG > 200 mg/dL. + Non-HDL cholesterol = total cholesterol minus HDL cholesterol.

<sup>1</sup> Smith S Blair S Bonow R et al, AHA/ACC Scientific Statement: AHA/ACC Guidelines for Preventing Heart Attack and Death in Patients With Atherosclerotic Cardiovascular Disease: 2001 Update. *Circulation*. 2001;104:1577-1579.

## UPDATE ON HORMONE REPLACEMENT THERAPY

**The American Heart Association advises that women with or without established Coronary Heart Disease should not start or continue combined Hormone Replacement Therapy for the prevention of coronary heart disease.**

The week of July 8, 2002, scientists at the National Heart, Lung, and Blood Institute announced that they had stopped a large study of hormone replacement therapy (HRT), a combination of estrogen plus progestin. This trial, called the Women's Health Initiative (WHI), showed that HRT significantly increased the risk of invasive breast cancer and blood clots in the legs and lungs and did not protect women from heart disease and stroke. In fact, the study showed that women taking HRT had a higher risk of heart attack and stroke. (The hormone formulation studied in this trial was CEE/MPA [brand name Prempro]. The medical name is oral conjugated equine estrogens [CEE] with oral medroxyprogesterone acetate [MPA].)

Last year the American Heart Association updated its recommendations for HRT. We said that hormone treatment should not be used to try to prevent a second heart attack or death among women with established heart disease.

Many people have been confused and alarmed by the recent news about the WHI. To help you understand what it means, we've prepared a Q&A to provide some perspective. Before you make any decisions, though, it's very important to consult your physician.

## Q & A ABOUT HORMONE REPLACEMENT THERAPY

**What if I'm taking HRT or considering taking HRT to prevent heart disease or stroke?**

HRT should not be used to prevent heart disease or stroke in postmenopausal women. Many established methods are available to lower heart disease risk in women. Lowering cholesterol and controlling blood pressure are two examples. If blood pressure and cholesterol aren't controlled with lifestyle measures such as not smoking, getting regular physical activity and a eating a heart-healthy diet, then drug therapy may be indicated. Certain medications, such as aspirin, statins, beta-blockers and ACE inhibitors, also may benefit women who have cardiovascular disease or are at high risk of developing it.

**What if I'm taking estrogen alone or another type of HRT to prevent heart disease or stroke?**

Important research on the effects of estrogen alone is still under way. However, until there's clear evidence that this or other forms of HRT not tested in recent clinical trials are beneficial, women should not use these therapies to prevent heart disease and stroke. Newer estrogen therapies such as selective estrogen receptor modulators (SERMs) aren't the same as HRT. They don't treat menopausal symptoms and don't seem to increase the risk of breast cancer - but they are effective in treating osteoporosis and preventing fractures. Studies are under way to find out if they lower the risk of heart disease. However, like HRT, these should not be used for this purpose until more research is available.

**What if I'm taking HRT or estrogen for other reasons, such as relief of menopausal symptoms?**

For many women, using HRT for short-term relief of menopausal symptoms may be worth the small absolute increase in risk for heart disease or breast cancer. Because the risk of these complications rises the longer HRT is used, HRT should be used for the shortest time necessary. Women who've had premature menopause because their ovaries were surgically removed should consult their physician(s) about when to stop estrogen therapy.

**What if I'm taking HRT to prevent osteoporosis?**

HRT is effective for preventing osteoporosis and bone breaks, but these benefits may not outweigh the risk of breast cancer and cardiovascular disease. Other options should be considered.

**Is more research under way to evaluate using other forms of hormone therapy to prevent and treat heart disease?**

Yes. The WHI results show that one mixture of hormones for hormone replacement therapy didn't work the way physicians assumed it would. This shows why research studies like the WHI are so important. It also makes scientists more intent than ever to discover new types of estrogens that might help prevent and treat heart diseases. It could be that in the future new and different estrogens or SERMs might help prevent and/or treat heart disease. Many different kinds of estrogens and SERMs are now being tested.

# DATA SOURCES AND METHODS

## Data Sources

### Mortality Data

The Michigan Death Certificate, a modified version of the National Standard Death Certificate, contains information about the decedent's dates of birth and death, residence, place the death occurred, race, gender, marital status, whether an autopsy was performed, and underlying and contributing cause of death. The Michigan Resident Death File is approximately 99% complete.

### Michigan Inpatient Data Base

The MIDB contains data information on gender, race, Hispanic ethnicity, date of birth, age, zip code of mailing address, admission and discharge date, length of hospital stay, source of payment, principal and secondary diagnoses, and principal and secondary procedures for Michigan residents hospitalized in a given year.

### Behavioral Risk Factor Surveillance System

The Michigan Behavioral Risk Factor System (BRFS), a component of the national BRFS, an ongoing surveillance system, is an annual, population-based, random-digit-dialed telephone survey of adults conducted by state health departments in cooperation with the Centers for Disease Control and Prevention. The BRFS collects information about risk behaviors related to the major causes of mortality and morbidity. Information on CVD includes high blood pressure, cholesterol, obesity, nutrition, physical activity and smoking. The 1999 Michigan BRFS was conducted across the calendar year. The cooperation rate (percent of all eligible household contacts that resulted in a completed interview) was 45.4%. The total sample size was 2,512 in 2000.

### Population data

Population estimates by age, race and gender were developed by the Office of the State Demographer, Michigan Department of Management and Budget, using a mathematical model which reflects Census Bureau statewide estimates by single year of age and county estimates of total population.

## Methods

### Calculation of age-adjusted mortality rates

Age-adjustment is used to modify the calculation of death rates to reflect the age distribution of the population to a standard population so that a comparison of the burden of the disease among different groups can be made. Death rates were age-adjusted using the direct method: the U.S. 2000 population estimate was used as the standard. National age-adjusted rates were obtained from the National Center for Health Statistics.

### Calculation of Cardiovascular Disease Rates for Counties

Because mortality rates are subject to random variation, counties with small populations are more likely to have rates which fluctuate widely from the true, unknown rates. For counties with small populations and small numbers of heart disease and stroke deaths, the estimated death rates are likely to have large variances, which results in unstable and non-reliable rates.

# HEART ATTACK

## WARNING SIGNS

Some heart attacks are sudden and intense – the “movie heart attack”, in which a person dramatically gasps, clutches his heart and drops to the ground, and no one doubts what's happening. But most heart attacks start slowly, with mild pain or discomfort. Often the people affected aren't sure what's wrong and wait too long before getting help. Here are some of the signs that can mean a heart attack is happening.

- **Chest discomfort.** Most heart attacks involve discomfort in the center of the chest that lasts more than a few minutes, or that goes away and comes back. It can feel like an uncomfortable pressure, squeezing, fullness or pain.
- **Discomfort in other areas of the upper body.** Symptoms can include pain or discomfort in one or both arms, the back, neck, jaw or stomach.
- **Shortness of breath.** This feeling often come along with the chest discomfort. But it can occur before the chest discomfort.
- **Other signs.** These may include breaking out in a cold sweat, nausea or lightheadedness.

If you or someone you're with has chest discomfort, especially with one or more of the other signs, don't wait longer than a few minutes (no more than 5) before calling for help. **Call 9-1-1...Get to a hospital right away.**

Calling 9-1-1 is almost always the fastest way to get lifesaving treatment. Emergency medical services (EMS) staff can begin treatment when they arrive -- up to an hour sooner than if someone gets to the hospital by car. The staff are also trained to revive someone whose heart has stopped. You'll also get treated faster in the hospital if you arrive by ambulance. If you can't access the EMS, have someone drive you to the hospital right away. If you're the one having the symptoms, don't drive yourself unless you have absolutely no other option.

# STROKE

## WARNING SIGNS

- Sudden numbness or weakness of the face, arm or leg, especially on one side of the body.
- Sudden confusion, trouble speaking or understanding.
- Sudden trouble seeing in one or both eyes.
- Sudden trouble walking, dizziness, loss of balance or coordination.
- Sudden, severe headache with no known cause.

Not all these warning signs occur in every stroke. If some start to occur, don't wait. Get help immediately.

**Stroke is a medical emergency — call 9-1-1.**



Fighting Heart Disease and Stroke

For heart- or risk-related information, call 1-800-AHA-USA1 (1-800-242-8721) or contact your nearest office. You can also visit us online at [americanheart.org](http://americanheart.org)

## American Stroke Association<sup>SM</sup>

A Division of American Heart Association 

For stroke information, call our American Stroke Association at 1-888-4-STROKE (1-888-478-7653), or visit [StrokeAssociation.org](http://StrokeAssociation.org).

For information on life after stroke, call and ask for the Stroke Family Support Network.

Your contribution will support research and educational programs that help reduce disability and death from America's No. 1 and No. 3 killers.