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A Division of American
Heart Association

American Heart
Association®

Fighting Heart Disease and Stroke

2002
Heart
and Stroke
Statistical Update

**Our guide to current statistics and the supplement to
our "Heart and Stroke Facts"**

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About These Statistics

All statistics are for the most recent year available. 1999 final mortality data are used. Prevalence statistics and hospital discharges/hospitalizations are computed for 1999 unless otherwise noted; figures on incidence and economic cost are for 2002. U.S. and state death rates and prevalence are age-adjusted (unless otherwise specified) per 100,000 population using the 2000 U.S. standard as the base. Death rates by country use the World Health Organization (WHO) European standard.

If you have questions about biostatistics or any points made in this booklet, please contact the Biostatistics Consultant at the National Center, 214-706-1423. Direct media inquiries to News Media Relations at 214-706-1173.

We do our utmost to ensure that this booklet is error-free. If we discover errors after publication, we'll provide corrections at our Web site, americanheart.org. Click on "Publications & Resources," then "Statistics," then "2002 Heart and Stroke Statistical Update."

Acknowledgement

We would like to thank the members of the Council on Epidemiology and Prevention's Committee on Statistics for their contributions to this booklet.

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UNDERSTANDING
and Using Our Biostatistics

The American Heart Association is the leading authority on heart and blood vessel diseases. It's important for our volunteers, our staff and the public to understand how we derive the annual statistics in this booklet. It's also important to understand their limitations.

Morbidity and mortality data in the United States use a standard classification system — the International Classification of Diseases. About every 10-20 years the ICD codes are revised. **The first step in any analysis is to determine which revision of the ICD is the source of the codes.** The revisions reflect changes over time in medical technology, diagnosis or terminology. Effective with mortality data for 1999, we're using the tenth revision (ICD/10). It will be a few more years before the tenth revision is used for hospitalizations and discharge data.

Prevalence

Prevalence is an estimate of how many people have a specific disease at a given point in time. This number is useful in assessing the level of medical and social care needed to cope with the current cases.

To estimate prevalence, the American Heart Association works very closely with government agencies. They include the Centers for Disease Control and Prevention's National Center for Health Statistics (CDC/NCHS), the National Heart, Lung, and Blood Institute (NHLBI), etc. By working with these agencies, we can get the latest data from major studies being conducted in the United States.

No one conducts yearly nationwide health examinations to count the exact number of people with any health condition. Instead, health examination surveys are done periodically by government agencies. Rates for specific diseases are calculated from those surveys. These rates are applied as the population changes for several years, until a new health examination survey is done and new rates are established. It's important to realize that the rates **do not change** from year to year until there is a new survey.

It follows that **the annual changes in prevalence as reported in this booklet only reflect changes in the population. It's impossible to develop a prevalence "trend" from yearly issues of this booklet or its precursors.** In fact, comparing numbers from back issues is misleading and can lead to serious mistakes!

Incidence

Incidence is an estimate of the number of new cases of a disease that develop in a population in a one-year period. It's an indicator of the need for preventive measures. It's also one way to evaluate the effectiveness of existing programs. For some statistics, new and recurrent attacks or cases are combined.

Like prevalence figures, incidence figures aren't computed annually. But unlike prevalence figures, they aren't calculated by applying a rate to a changing population. Instead, incidence estimates stay the same year after year until new data are released from a reliable study. **This is why incidence trends should not be described using past issues of this booklet.** Incidence figures only change when the studies change. Unless the criteria and methodology of these studies are the same, there's a danger of comparing apples and oranges and basing a "trend" on data that should not be compared.

Our incidence estimates for the various cardiovascular diseases are extrapolations from the Framingham Heart Study, Atherosclerotic Risk in Communities (ARIC) study and Cardiovascular Health Study (CHS). All of these were conducted by the NHLBI. Data from other government-sponsored studies will be available from time to time. We may use it if all agencies are in agreement.

Mortality

The most accurate data available for assessing the impact of cardiovascular diseases and stroke are mortality figures. These data are compiled from death certificates and sent by state health agencies to the National Center for Health Statistics (NCHS) in Hyattsville, Maryland. Here the information is verified and tabulated by cause of death, age, sex and race/ethnicity. This process is very time-consuming. That's why the statistics in this booklet and other American Heart Association print and electronic materials seem to be about two years "late." For example, 1999 mortality statistics, the latest available, didn't become available until 2001. Because mortality is considered "hard" data, it's possible to do time-trend analysis and compute percent changes over time.

Comparability Across ICD/9 and ICD/10

The ICD revisions can cause considerable change in the number of deaths reported for a given disease. For example, in 1998, the last year of ICD/9, about 158,000 deaths were reported for stroke. In 1999, using ICD/10, 167,366 deaths are reported for stroke. One reason for the difference is the new coding rule, which shifted deaths from influenza and pneumonia to stroke when stroke was also listed on the death certificate.

To allow statisticians and planners to cope with these changes, the NCHS provides "comparability ratios." We use the ratios to modify numbers of deaths and mortality rates from different revisions of the International Classification of Diseases to make them more comparable. When using multiple revisions spanning several decades, we must modify the figures using multiple comparability ratios.

Comparability ratios are available for each of the more common causes of death. With 1999 mortality data, there's an overall ratio for each cause of death and separate ratios by age, sex and race/ethnicity. In this booklet we use the reported 1999 mortality when we want to show only 1999 data. When we want to show the number or rate of deaths in 1999 compared with that of an earlier year (1989 usually), then we use the "comparability-modified" 1999 number or rate.

The new revision includes an additional cause-of-death category, "atherosclerotic cardiovascular disease, so described," as part of the coding of coronary heart disease (CHD). That means in 1999 there were 529,659 deaths from CHD, compared with 459,841 in 1998. Most of the increase was due to the addition of that cause-of-death term. The American Heart Association approves of the change to this broader definition of CHD and will tabulate mortality for the years 1979-98 accordingly, using ICD/9 codes 410-414, 429.2.

Using data from old issues of this booklet to construct mortality trends can lead to errors unless all data are from the same ICD revision.

Death Rates

A death rate is a **ratio** between mortality and population. This is the most widely used measure to determine the overall health of a community. National death rates are computed per 100,000 population. Dividing the mortality by the population results in a **crude** death rate.

When summarizing crude death rates over time or among populations, we compute **age-adjusted** death rates. These remove the effects from differences in the age distribution of the population. The base year that the federal government and health organizations used for almost 60 years was 1940. We also use age-adjusted rates when comparing populations with very different age distributions, such as Florida and Alaska (a relatively old vs. a relatively young population).

In 1940 there were 132 million Americans. By 1999 the population had more than doubled to about 273 million. In 1940 the proportion of Americans over age 65 was only 6.8 percent. By 1999 the percentage had increased to 12.7.

Since 1940 the number of deaths from cardiovascular diseases has increased, partly because the elderly population has increased as a percentage of the total U.S. population. To compensate for this aging and growth of the population, scientists have age-adjusted rates so that any decreases or increases in rates can be more accurately monitored over time.

Age-adjusted death rates for many cardiovascular diseases have been declining for many years. This is due in part to age-adjusting to the 1940 standard. **Since 1999 the American Heart Association has used the year 2000 as the age-adjustment standard. This has resulted in a doubling or tripling of the former age-adjusted death rates.** The 2000 standard more closely matches today's (older) population with the current mortality.

The annual numbers of deaths aren't affected by the change. However, while age-adjusted rates for cardiovascular diseases will now be higher than before, their comparisons over time or among race, sex and geographic groups will be only a little different under the new standard than before.

Declines in death rates from cardiovascular diseases are largely responsible for the recent major improvement in life expectancy. Based on recent preliminary data, the average life expectancy of people born in the United States is now 76.7 years.

Many factors may affect the decline in CVD mortality. They include more effective medical treatment, more emphasis on reducing the major controllable cardiovascular risk factors (high blood pressure, smoking, high blood cholesterol, physical inactivity, overweight and obesity, and diabetes), and better treatment for heart attack and stroke patients.

COMMON CLASSIFICATIONS
of Cardiovascular Diseases

In compiling our statistics, the American Heart Association looks at specific cardiovascular disease categories, based on the tenth revision of the ICD codes (ICD/10, see "Mortality" on page 1). It's important to understand what the following terms mean. By excluding or including different cardiovascular diseases, it's possible to get very different perspectives on the scope of CVD.

Cardiovascular Diseases

"Major Cardiovascular Diseases" represents ICD codes (I00-I78). The American Heart Association uses "Total Cardiovascular Disease," which is more inclusive. It comprises codes (I00-I99), which includes Diseases of Veins and Lymphatics (I80-I89).

When data are available, we add congenital cardiovascular defects codes (Q20-Q28) to "Total Cardiovascular Disease."

"Total Cardiovascular Disease" is sometimes called "Diseases of the Circulatory System" (I00-I99). Mortality data for a state or county obtained from state health agencies may be defined differently. You can obtain "Diseases of the Circulatory System" for states from **www.cdc.gov/nchs** or by direct communication with the CDC/NCHS. Our National Center Biostatistics Consultant obtains these data annually from the NCHS Web site and enters them into a State Mortality database. You can receive copies of any state's mortality data from the National Center upon request.

Diseases of the Heart

The NCHS tabulates mortality of "Diseases of the Heart." The term is commonly used in its statistical publications and its compilation of the **leading causes of death.** This category groups diseases containing words referring to the "heart" and **includes...**

- Acute Rheumatic Fever/Chronic Rheumatic Heart Diseases (I00-I09)

- Hypertensive Heart Disease (I11) and Hypertensive Heart and Renal Disease (I13)
- Coronary Heart Disease (I20-I25)
- Pulmonary Heart Disease and Diseases of Pulmonary Circulation (I26-I28)
- Congestive Heart Failure (I50.0)
- Other Forms of Heart Disease (I29-I49, I50.1-I52)

"Diseases of the Heart" is **not** equivalent to "Total Cardiovascular Disease." The American Heart Association doesn't use the "Diseases of the Heart" category because of this confusion. "Diseases of the Heart" represents about three-fourths of "Total Cardiovascular Disease" mortality.

ABOUT SUDDEN
Death and Cardiac Arrest

Sudden death from cardiac arrest is a major health problem that has received much less publicity than heart attack. The American Heart Association offers these statistics as part of our public awareness campaign to increase cardiac arrest survival across the United States.

Although the direct medical costs are much less than for lingering illnesses, the economic and social impacts of sudden death from cardiac arrest are huge. Sudden death occurs on average at about 60 years of age, claims many people during their most productive years, and devastates unprepared families.

Sudden death (also called **sudden cardiac death**) occurs when the heart stops abruptly (cardiac arrest). Death can occur within minutes after the victim collapses. Most cases of **cardiac arrest** (also called **sudden cardiac arrest** or **unexpected cardiac arrest**) that lead to sudden death occur when the heart's electrical impulses become rapid (ventricular tachycardia) and then chaotic (ventricular fibrillation or VF). This irregular heart rhythm causes the heart to suddenly stop pumping blood. A small number of cardiac arrests are caused by extreme slowing of the heart (bradycardia).

Most known heart diseases can lead to cardiac arrest and sudden death. The most common underlying cause is coronary heart disease, which includes heart attack. In 90 percent of adult victims of sudden death, two or more major coronary arteries are narrowed by atherosclerosis. Scarring from a prior heart attack is found in two-thirds of victims.

When sudden death occurs in young adults, other heart abnormalities are more likely causes. Under certain conditions, various heart medications and other drugs — as well as illegal drug abuse — can lead to abnormal heart rhythms that cause cardiac arrest and sudden death. Other causes of cardiac arrest include respiratory arrest, electrocution, drowning, choking and trauma. Cardiac arrest also can occur without any known cause.

No statistics are available for the exact number of cardiac arrests that occur each year. However, about 250,000 people a year die of coronary heart disease without being hospitalized. That's about half of all deaths from CHD — more than 680 Americans each day.

If cardiac arrest victims receive no treatment, brain damage can start to occur in just 4 to 6 minutes after the heart stops pumping blood. If cardiac arrest victims receive immediate cardiopulmonary resuscitation (CPR), it will keep blood flowing to the heart and brain until definitive treatment is provided. CPR consists of mouth-to-mouth rescue breathing and chest compressions.

VF cardiac arrest can be reversed if the victim is treated with an electric shock to the heart within a few minutes. The electric shock can stop the abnormal rhythm and allow a normal rhythm to resume. This process, called defibrillation, is done using a defibrillator. Lay rescuers can be trained to operate portable, computerized, automated external defibrillators (AEDs).

A victim's chances of survival after VF cardiac arrest are reduced by 7 to 10 percent with every minute that passes without treatment. Few resuscitation attempts succeed after 10 minutes have elapsed. It's estimated that more than 95 percent of cardiac arrest victims die before reaching the hospital.

Early CPR and rapid defibrillation combined with early advanced care can produce high long-term survival rates for witnessed cardiac arrest. In some cities with public access defibrillation programs, when bystanders provide **immediate** CPR and the first shock is delivered **within 3 to 5 minutes**, the reported survival rates from VF cardiac arrest are as high as 48 to 74 percent.

If survival rates from sudden cardiac arrest were increased from 5 percent to 20 percent, up to 40,000 more lives could be saved each year. The American Heart Association urges the public to **be prepared for cardiac emergencies:**

- **Know the warning signs of heart attack and cardiac arrest.** During cardiac arrest, a victim becomes unresponsive, stops normal breathing, and loses pulse or other signs of circulation. (See heart attack warning signs at the end of this booklet.)
- **Call 9-1-1 immediately** to access the emergency medical services (EMS) if you see any warning signs of heart attack or if someone collapses suddenly and is unresponsive.
- **Begin cardiopulmonary resuscitation immediately.** This will help keep the cardiac arrest victim alive until emergency help arrives. CPR keeps blood flowing to the heart and brain until defibrillation can be provided.
- **Provide early defibrillation with an automated external defibrillator.** Public access defibrillation programs can train lay rescuers to perform CPR and use an AED in the community.

Death from cardiac arrest is not inevitable. If more people react quickly by calling 9-1-1 and performing CPR, more lives can be saved. In the rest of this booklet, statistics about sudden death and cardiac arrest are highlighted in pink.

CARDIOVASCULAR
Diseases

(ICD/9 390-459, 745-747) (ICD/10 I00-I99, Q20-Q28; see Glossary for details)

Prevalence

61,800,000 Americans have one or more types of cardiovascular disease (CVD) according to current estimates.[1] Of these, 29,700,000 are male and 32,100,000 are female. 24,750,000 are estimated to be age 65 and older.

- High blood pressure[2] — 50,000,000.[1]
- Coronary heart disease — 12,600,000.[1]
  - Myocardial infarction — 7,500,000.[1]
  - Angina pectoris — 6,400,000.[1]
- Stroke — 4,600,000.[1]
- Congenital cardiovascular defects — 1,000,000.[3]
- Congestive heart failure — 4,790,000.[1]
- 1 in 5 males and females has some form of cardiovascular disease.[1]

Mortality

CVD claimed 958,775 lives in the United States in 1999. This is 40.1 percent of all deaths or 1 of every 2.5 deaths. CVD was about 60 percent of "total mention mortality," which means that of the more than 2,000,000 deaths from all causes, CVD was listed as a primary or contributing cause on about 1,391,000 death certificates.

- Since 1900, CVD has been the No. 1 killer in the United States every year but 1918.
- More than 2,600 Americans die of CVD each day, an average of 1 death every 33 seconds.
- CVD claims almost as many lives each year as the next 7 leading causes of death combined.
- Almost 150,000 Americans killed by CVD each year are under age 65.
- 1999 CVD mortality: male deaths — 445,871 (46.5 percent of deaths from CVD); female deaths — 512,904 (53.5 percent of deaths from CVD). (Note: Includes congenital cardiovascular disease.)
- In 1999, 33 percent of deaths from CVD occurred prematurely (i.e., before age 75, the approximate average life expectancy in that year).

[1] *National Health and Nutrition Examination Survey III (NHANES III), 1988-94, CDC/NCHS and the American Heart Association.*

[2] *A person is considered to have high blood pressure when he or she has a systolic pressure of 140 mm Hg or greater, and/or a diastolic pressure of 90 mm Hg or greater, or is taking antihypertensive medication.*

[3] *National Health and Nutrition Examination Survey II (NHANES II), 1976-80, CDC/NCHS and the American Heart Association.*

- The 1999 overall death rate from CVD was 354.1. The rates were 411.5 for white males and 526.0 for black males; 295.0 for white females and 402.1 for black females.
- From 1989 to 1999 death rates from CVD (ICD/10 I00-I99) declined 15.6 percent. In the same 10-year period actual CVD deaths increased 2.1 percent.

Comparisons

- Other causes of death in 1999 — cancer 549,838; accidents 97,860; Alzheimers disease 44,536; HIV (AIDS) 14,802.
- According to the most recent CDC/NCHS computations, if all forms of major CVD were eliminated, life expectancy would rise by almost 7 years. If all forms of cancer were eliminated, the gain would be 3 years. According to the same study, the probability at birth of eventually dying from major CV diseases (ICD/9 390-448) is 47 percent, and the chance of dying from cancer is 22 percent. Additional probabilities are 3 percent for accidents, 2 percent for diabetes and 0.7 percent for HIV. (U.S. Decennial Life Tables for 1989-91, Vol. 1, No. 4, Sept. 1999)
- In the United States in 1999, CVD claimed the lives of 445,871 males and 512,904 females, while cancer killed 285,832 males and 264,006 females. The CVD death rates were 418.2 for males and 303.2 for females; cancer death rates were 251.6 for males and 169.9 for females.
- Breast cancer claims the lives of 41,144 females each year; lung cancer claims 62,703. The 1999 death rates were 27.0 for breast cancer and 40.8 for lung cancer.

Age, Sex, Race and Ethnicity

- Based on data from the NHLBI's Framingham Heart Study in its 44-year follow-up of participants and the 20-year follow-up of their offspring...
  - The average annual rates of first major cardiovascular events rise from 7 per 1000 men at ages 35-44 to 68 per 1000 at ages 85-94. For women, comparable rates are achieved 10 years later in life. The gap closes with advancing age.
  - Under age 75, there is a higher proportion of CVD events due to coronary heart disease (CHD) in men than in women, and a higher proportion due to congestive heart failure (CHF) in women than in men.
- The age-adjusted prevalence of CVD in adults for non-Hispanic whites is 30.0 percent for men and 23.8 for women; for non-Hispanic blacks it's 40.5 percent for men and 39.6 for women; and for Mexican Americans it's 28.8 percent for men and 26.6 for women. (NHANES III [1988-94], CDC/NCHS)
- There are higher CVD risk factors among black and Mexican-American women than among white women of comparable socioeconomic status (SES). The large differences by both ethnicity and SES underscore the critical need to improve screening, early detection and treatment of CVD-related conditions for black and Mexican-

American women, as well as for women of lower SES in all ethnic groups. (NHANES III [1988-94], CDC/NCHS, *JAMA*. 1998;280:356-362)

- Among American Indians/Alaska Natives age 18 and older, 63.7 percent of men and 61.4 percent of women have one or more CVD risk factors (hypertension, current cigarette smoking, high blood cholesterol, obesity or diabetes). If data on physical activity had been included in this analysis, the prevalence of risk factors probably would have been higher. (Behavioral Risk Factor Surveillance System, BRFSS [1997], CDC/NCHS)

- Surveys show that most women are far more afraid of breast cancer than of cardiovascular disease (even though 1 in 30 women's deaths is from breast cancer while 1 in 2.4 is from CVD).

Aftermath

- From 1979 to 1999 the number of Americans discharged from short-stay hospitals with CVD as the first listed diagnosis increased 29 percent.

- In 1999 CVD ranked highest among all disease categories in numbers of hospital discharges. That year CVD was the first listed diagnosis of 6,344,000 inpatients (3,161,000 males and 3,183,000 females).

- In 1999 there were 59,965,000 physician office visits and 5,862,000 outpatient department visits with a primary diagnosis of CVD. (National Hospital Ambulatory Medical Care Survey, 1999, CDC/NCHS)

- In 1998, $26.4 billion in payments were made to Medicare beneficiaries for hospital expenses due to cardiovascular problems. That was an average of $7,937 per discharge. (Health Care Financing Review, Statistical Supplement [2000], HCFA)

- In 1997, 25.8 percent of elderly nursing home residents age 65 and older had a primary diagnosis of cardiovascular disease at admission. This was the highest disease category for these residents. (1997 National Nursing Home Survey, USDHHS, April 25, 2000)

- In 1999 the annual rate of emergency department visits for cardiovascular conditions was 16.2 per 1,000 persons, up from 15.4 in 1992. (Trends in Hospital Emergency Department Utilization: U.S. 1992-99, CDC/NCHS)

Cardiovascular Disease Mortality Trends for Males and Females
United States: 1979-99

Source: CDC/NCHS and the American Heart Association.

Deaths From Diseases of the Heart*
United States: 1900-99
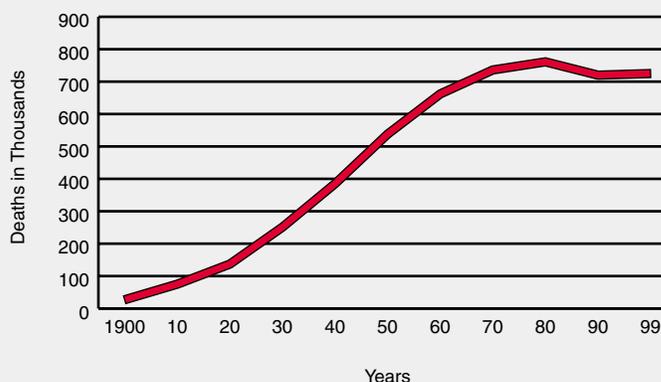
* See "Common Classifications of Cardiovascular Diseases" on pages 2-3 for an explanation of "Diseases of the Heart." Total cardiovascular disease data are not available for much of the time period covered by this chart.

Source: CDC/NCHS and the American Heart Association.

Hospital Discharges* for Cardiovascular Diseases
United States: 1979-99
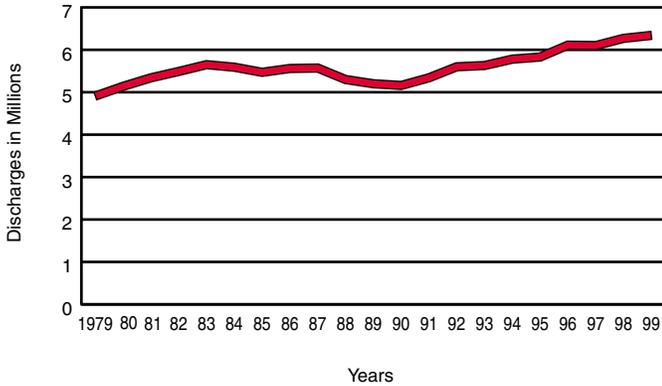
Years

* Hospital discharges include people both living and dead.

Source: CDC/NCHS and the American Heart Association.

Percentage Breakdown of Deaths From Cardiovascular Diseases
United States: 1999

- 0.5% Congenital Cardiovascular Defects
- 15% Other
- 55% Coronary Heart Disease
- 0.4% Rheumatic Fever/ Rheumatic Heart Disease
- 2% Diseases of the Arteries
- 5% High Blood Pressure
- 6% Congestive Heart Failure
- 17% Stroke
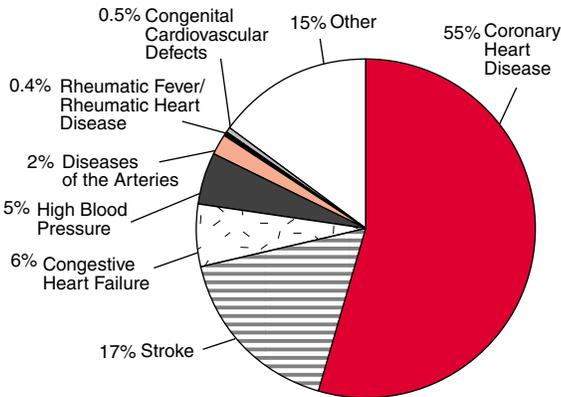
Source: CDC/NCHS and the American Heart Association.

Prevalence of Cardiovascular Diseases in Americans Age 20 and Older by Age and Sex
United States: 1988-94
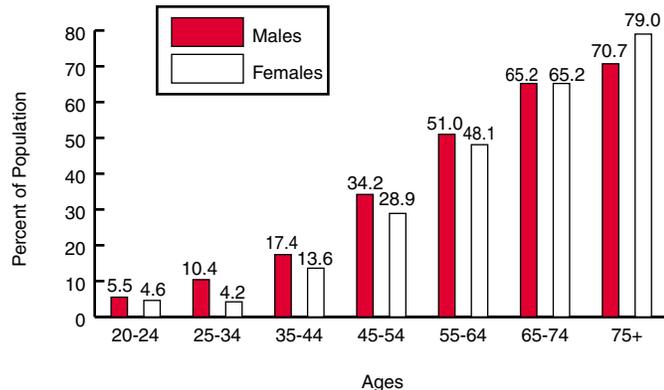
Ages

Source: NHANES III (1988-94), CDC/NCHS and the American Heart Association.

Leading Causes of Death for All Males and Females
United States: 1999
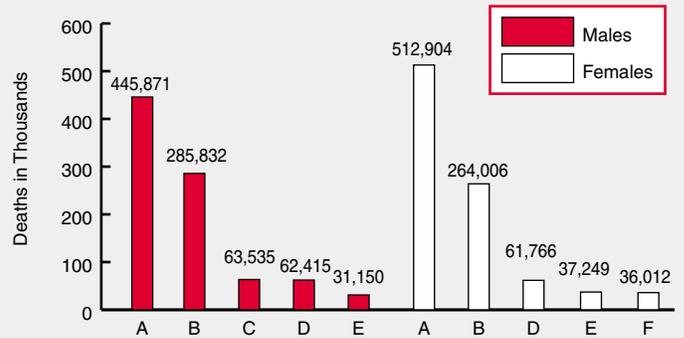
A Total CVD
B Cancer
C Accidents
D Chronic Lower Respiratory Diseases
E Diabetes Mellitus
F Influenza and Pneumonia

Source: CDC/NCHS and the American Heart Association.

Leading Causes of Death for White Males and Females
United States: 1999
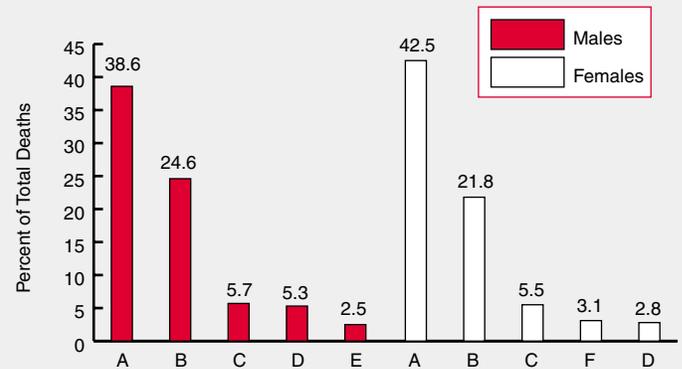
A Total CVD
B Cancer
C Chronic Lower Respiratory Diseases
D Accidents
E Diabetes Mellitus
F Influenza and Pneumonia

Note: Using "Diseases of the Heart, and Stroke," which do not constitute total CVD, the percentages of the "A" bars would be 36.1 for males and 39.5 for females.

Source: CDC/NCHS and the American Heart Association.

Leading Causes of Death for Black Males and Females
United States: 1999

Legend: Males (red), Females (white)

Y-axis: Percent of Total Deaths

Males: A 33.8, B 22.5, C 6.0, D 4.3, E 3.8
Females: A 40.8, B 20.9, F 5.1, C 2.8, G 2.7
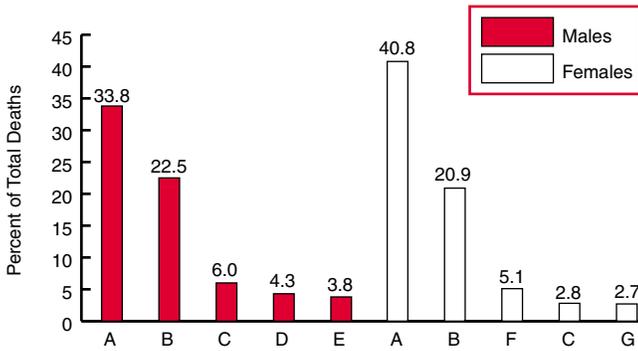
A Total CVD
B Cancer
C Accidents
D Assault (Homicide)
E HIV (AIDS)
F Diabetes Mellitus
G Nephritis, Nephrotic Syndrome and Nephrosis

Note: Using "Diseases of the Heart, and Stroke," which do not constitute total CVD, the percentages of the "A" bars would be 31.2 for males and 37.3 for females.

Source: CDC/NCHS and the American Heart Association.

Leading Causes of Death for Asian/Pacific Islander* Males and Females
United States: 1999
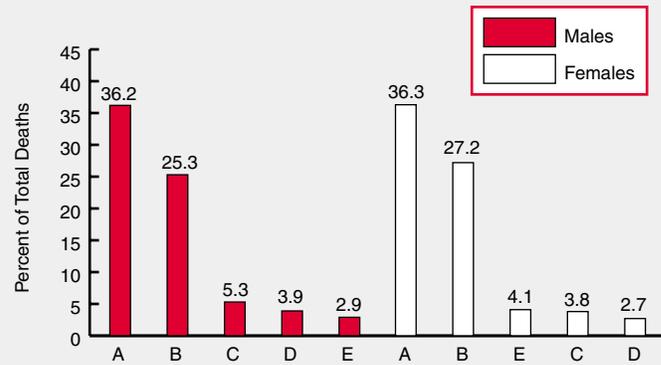
Legend: Males (red), Females (white)

Y-axis: Percent of Total Deaths

Males: A 36.2, B 25.3, C 5.3, D 3.9, E 2.9
Females: A 36.3, B 27.2, E 4.1, C 3.8, D 2.7

A Diseases of the Heart, and Stroke
B Cancer
C Accidents
D Chronic Lower Respiratory Diseases
E Diabetes Mellitus

* This is a heterogeneous category that includes both high-risk (South Asian) and low-risk (Japanese) people. More specific data aren't available.

Source: CDC/NCHS and the American Heart Association.

Leading Causes of Death for Hispanic Males and Females
United States: 1999

Legend: Males (red), Females (white)

Y-axis: Percent of Total Deaths

Males: A 28.2, B 18.4, C 11.3, D 4.1, E 4.0
Females: A 33.7, B 20.9, E 6.2, C 4.5, F 2.9
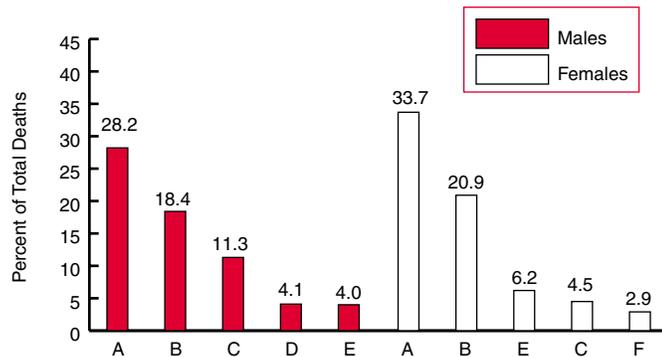
A Diseases of the Heart, and Stroke
B Cancer
C Accidents
D Assault (Homicide)
E Diabetes Mellitus
F Chronic Lower Respiratory Diseases

Source: CDC/NCHS and the American Heart Association.

Leading Causes of Death for American Indian/Alaska Native Males and Females
United States: 1999

Legend: Males (red), Females (white)

Y-axis: Percent of Total Deaths

Males: A 25.2, B 15.6, C 14.6, D 5.3, E 4.9
Females: A 27.0, B 17.0, C 8.4, D 7.7, E 4.1
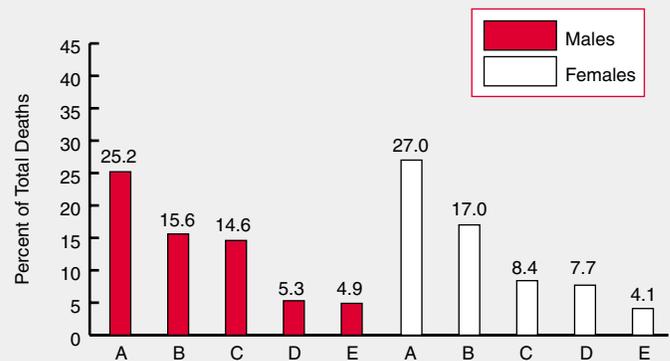
A Diseases of the Heart, and Stroke
B Cancer
C Accidents
D Diabetes Mellitus
E Chronic Liver Disease and Cirrhosis

Source: CDC/NCHS and the American Heart Association.

1996-98 Age-Adjusted Death Rates for Total Cardiovascular Disease,* Coronary Heart Disease** and Stroke# by State (includes District of Columbia and Puerto Rico)

State	Total Cardiovascular Disease* Rank##	Death Rate	Percent Change 1986-88 to 1996-98	Coronary Heart Disease** Rank##	Death Rate	Percent Change 1986-88 to 1996-98	Stroke# Rank##	Death Rate	Percent Change 1986-88 to 1996-98
Alabama	45	408.0	-15.7	16	173.3	-27.5	42	68.1	-20.2
Alaska	4	296.6	-24.8	3	134.2	-33.9	33	63.7	0.2
Arizona	10	314.3	-17.1	21	181.3	-24.6	9	56.2	2.7
Arkansas	48	413.4	-13.4	38	211.8	-10.9	51	85.4	-1.8
California	19	339.5	-21.6	30	203.8	-24.6	27	61.5	-19.2
Colorado	6	299.2	-21.3	7	147.6	-34.5	10	56.5	-6.8
Connecticut	18	338.7	-19.0	22	183.0	-28.2	7	52.1	-11.2
Delaware	30	361.4	-23.8	37	211.4	-29.3	6	51.8	-6.8
District of Columbia	34	379.6	-20.9	17	173.7	-24.1	20	60.4	-14.6
Florida	16	332.4	-18.9	33	206.9	-21.8	5	51.3	-18.4
Georgia	46	408.1	-17.5	24	186.3	-28.9	47	73.8	-22.0
Hawaii	1	289.4	-11.5	1	128.4	-29.1	14	58.9	0.0
Idaho	9	313.7	-21.7	10	161.8	-23.9	36	65.1	-15.2
Illinois	32	370.3	-24.1	39	211.8	-30.4	30	62.3	-11.3
Indiana	39	388.6	-18.9	35	207.9	-25.6	44	68.8	-15.4
Iowa	24	346.9	-18.0	40	212.8	-17.2	25	61.1	-10.4
Kansas	22	341.0	-17.6	15	171.4	-26.8	29	62.0	-8.2
Kentucky	47	410.4	-17.3	43	216.4	-23.5	40	67.6	-17.3
Louisiana	43	402.6	-19.9	32	206.4	-24.8	39	67.2	-14.7
Maine	26	347.8	-23.6	27	194.8	-32.0	11	57.0	-14.8
Maryland	28	351.3	-24.6	28	198.3	-25.4	18	60.0	-13.3
Massachusetts	11	315.4	-28.2	13	167.5	-36.7	2	49.3	-23.8
Michigan	41	388.8	-23.8	47	228.3	-30.5	31	62.7	-13.6
Minnesota	3	290.1	-26.9	5	140.4	-36.5	26	61.4	-16.7
Mississippi	52	465.4	-9.5	48	235.8	-19.4	46	69.9	-18.5
Missouri	42	399.5	-12.2	45	225.8	-14.6	35	64.5	-10.4
Montana	8	310.9	-20.2	6	146.1	-29.5	22	60.6	-7.9
Nebraska	25	347.1	-16.1	8	159.1	-30.6	16	59.6	-11.2
Nevada	36	379.9	-16.8	25	186.9	-25.4	32	63.0	0.2
New Hampshire	27	348.5	-21.3	34	207.6	-22.9	24	61.0	-13.2
New Jersey	29	353.8	-26.2	42	213.6	-31.7	3	50.1	-21.4
New Mexico	5	296.9	-16.6	11	165.3	-17.5	8	53.1	-10.3
New York	40	388.6	-20.4	52	259.9	-23.0	1	42.9	-27.5
North Carolina	37	383.4	-20.8	31	204.0	-29.0	49	77.8	-14.2
North Dakota	14	325.1	-16.8	18	174.0	-20.1	28	61.5	-6.3
Ohio	38	386.1	-21.2	44	217.0	-26.8	19	60.2	-16.0
Oklahoma	49	419.9	-10.4	49	239.6	-13.5	41	68.0	-15.1
Oregon	13	325.0	-21.3	9	159.4	-34.9	48	77.2	0.5
Pennsylvania	35	379.6	-21.6	41	212.9	-26.6	15	58.9	-11.8
Puerto Rico	7	302.6	NA	4	139.8	NA	13	58.5	NA
Rhode Island	20	340.0	-22.5	46	227.5	-24.3	4	51.2	-16.1
South Carolina	44	406.7	-21.7	29	202.8	-27.9	52	86.0	-16.3
South Dakota	17	332.6	-22.2	23	184.8	-25.2	21	60.5	-9.8
Tennessee	51	424.6	-13.0	51	244.3	-15.2	50	78.3	-12.9
Texas	33	371.6	-14.5	36	210.8	-7.6	37	66.3	-7.4
Utah	2	290.0	-26.3	2	133.3	-36.1	23	60.9	-14.2
Vermont	21	340.3	-23.5	26	192.6	-29.5	12	58.4	-12.6
Virginia	31	369.1	-20.5	19	178.6	-30.5	45	69.3	-14.7
Washington	12	317.5	-21.6	12	166.1	-30.6	43	68.1	-5.3
West Virginia	50	424.1	-17.2	50	242.2	-19.5	17	59.6	-18.7
Wisconsin	23	341.5	-22.2	20	180.6	-33.4	38	66.3	-8.8
Wyoming	15	326.5	-15.2	14	168.1	-15.1	34	63.9	-5.6
Total United States		**365.4**	**-20.1**		**205.8**	**-25.2**		**61.5**	**-14.5**

* Total cardiovascular disease is defined here as ICD/9 390-459.

** Coronary heart disease is defined here as ICD/9 410-414, 429.2.

Stroke is defined here as ICD/9 430-438.

## Rank is lowest to highest.

NA indicates not available.

Source: NCHS compressed mortality file for the years 1996 to 1998.

1996-98 Total Cardiovascular Disease Age-Adjusted Death Rates by State

Death Rates Per
100,000 Population

- 289.4 to 325.0
- 325.1 to 347.8
- 348.5 to 388.6
- 388.8 to 465.4

Alaska
Hawaii
Puerto Rico

1996-98 Coronary Heart Disease Age-Adjusted Death Rates by State

Death Rates Per
100,000 Population

- 128.4 to 167.5
- 168.1 to 192.6
- 194.8 to 211.8
- 212.8 to 259.9

Alaska
Hawaii
Puerto Rico

1996-98 Stroke Age-Adjusted Death Rates by State

Death Rates Per
100,000 Population

- 42.9 to 58.5
- 58.9 to 61.4
- 61.5 to 67.2
- 67.6 to 86.0

Alaska
Hawaii
Puerto Rico

Death Rates* for Total Cardiovascular Disease, Coronary Heart Disease, Stroke and Total Deaths in Selected Countries (most recent year available)

Men Ages 35-74 — Rate per 100,000 Population#

Country	CVD Deaths	CHD Deaths	Stroke Deaths	Total Deaths
Russian Federation (98)	1167	639	361	2502
Bulgaria (98)	1008	335	280	1775
Romania (99)+	867	355	282	1751
Hungary (99)+	842	420	207	2131
Poland (96)	735	267	111	1722
Czech Republic (99)+	598	318	120	1377
Argentina (96)	531	140	116	1344
Scotland (99)	460	321	69	1172
Ireland (97)	457	307	61	1072
Finland (98)+	438	288	72	1085
China – Rural (99)	413	64	243	1260
Northern Ireland (99)	406	293	62	983
Columbia (94)	397	190	90	1166
China – Urban (99)	389	106	217	1003
Austria (99)	369	205	59	938
United States (99)+	**360**	**230**	**41**	**1024**
Denmark (96)+	360	204	66	1144
England/Wales (99)	357	241	52	908
Greece (98)	353	170	82	864
Germany (99)+	347	190	53	973
Sweden (96)	335	216	51	799
Norway (97)+	332	213	51	879
New Zealand (98)	318	222	40	841
Portugal (99)	311	114	130	1116
Belgium (95)	307	153	51	1049
Korea (97)+	304	44	182	1325
Netherlands (99)+	299	151	46	890
Italy (95)	293	140	58	919
Canada (97)	280	184	36	849
Mexico (95)	273	137	61	1172
Israel (97)	270	127	53	868
Australia (98)+	253	172	38	767
Spain (98)	252	121	51	908
Switzerland (96)+	245	137	30	806
France (98)	213	85	41	966
Japan (97)+	186	57	79	743

Women Ages 35-74 — Rate per 100,000 Population#

Country	CVD Deaths	CHD Deaths	Stroke Deaths	Total Deaths
Russian Federation (98)	540	230	229	1001
Bulgaria (98)	504	128	173	839
Romania (99)+	480	167	186	877
Hungary (99)+	380	161	111	928
Poland (96)	325	79	72	742
Columbia (94)	286	110	84	748
China – Rural (99)	279	41	152	799
China – Urban (99)	273	71	147	663
Czech Republic (99)+	273	115	71	659
Argentina (96)	227	39	63	642
Scotland (99)	220	122	54	711
Mexico (95)	197	73	52	773
Ireland (97)	196	109	41	624
United States (99)+	**183**	**95**	**33**	**627**
Northern Ireland (99)	183	104	47	581
Korea (97)+	177	18	114	561
Greece (98)	170	50	60	429
Austria (99)	168	70	38	469
England/Wales (99)	165	85	41	564
Denmark (96)+	159	76	41	728
Portugal (99)	154	39	77	511
Germany (99)+	149	64	32	490
Finland (98)+	148	81	40	466
Belgium (95)	138	51	34	522
Israel (97)	139	64	33	535
New Zealand (98)	139	71	35	526
Netherlands (99)+	132	51	35	515
Sweden (96)	132	68	34	461
Canada (97)	122	65	25	489
Norway (97)+	119	60	33	485
Italy (97)	116	37	33	418
Australia (98)+	113	61	27	432
Spain (98)	99	32	28	373
Switzerland (96)+	95	40	20	408
Japan (97)+	85	20	41	341
France (98)	78	21	22	409

Legend: ■ CV Diseases ▢ All Causes

* Rates adjusted to the European Standard population.

ICD/9 codes are 390-459 for cardiovascular disease; 410-414 for coronary heart disease; and 430-438 for stroke. Exceptions are noted with +.

+ ICD/10 codes are I00-I99 for cardiovascular disease; I20-I25 for coronary heart disease; and I60-I69 for stroke.

*Source: The World Health Organization Web page, **www.who.int/whosis/** and NCHS.*

CORONARY
Heart Disease and Angina Pectoris

Coronary Heart Disease

(ICD/9 410-414, 429.2) (ICD/10 I20-I25; see Glossary for details)

Coronary heart disease (CHD) caused 529,659 deaths in the United States in 1999 — about 1 of every 5 deaths. CHD total mention mortality — 680,000 of the more than 2,000,000 deaths from all causes.

- CHD is the single largest killer of American males and females.

- About every 29 seconds an American will suffer a coronary event, and about every minute someone will die from one.

- This year an estimated 1,100,000 Americans will have a new or recurrent coronary attack (defined as myocardial infarction or fatal CHD). About 650,000 of these will be first attacks and 450,000 will be recurrent attacks.* Over 45 percent of the people who experience a coronary attack in a given year will die from it.

- About 250,000 people a year die of CHD without being hospitalized. Most of these are sudden deaths caused by cardiac arrest, usually resulting from ventricular fibrillation. (See also Arrhythmias, page 18.)

- Yearly totals of sudden cardiac death in people ages 15 to 34 rose from 2,719 in 1989 to 3,000 in 1996. Alarmingly, though the numbers are very small, the death rate increased by 30 percent in young women. Death rates were also higher among young African Americans than among Caucasians. (Sudden Cardiac Death in U.S. Young Adults, 1989-96, CDC, 2001)

- 12,600,000 people alive today have a history of heart attack, angina pectoris (chest pain) or both. This is about 6,200,000 males and 6,400,000 females.

- It's estimated that 7,500,000 Americans age 20 and older have a history of myocardial infarction (about 4,600,000 men and 2,900,000 women).

- From 1989 to 1999, the death rate from CHD declined 24.0 percent, but the actual number of deaths declined only 6.8 percent.

* Based on data from the Atherosclerotic Risk in Communities (ARIC) study of the National Heart, Lung, and Blood Institute (NHLBI), 1987-94. These data represent Americans hospitalized with definite or probable myocardial infarction (MI) or fatal CHD, not including silent MIs.

Age, Sex, Race and Ethnicity

- 85 percent of people who die of CHD are age 65 or older.

- The average age of a person having a first heart attack is 65.8 for men and 70.4 for women. (ARIC and CHS, NHLBI)

- About 80 percent of CHD mortality in people under age 65 occurs during the first attack. (Framingham Heart Study, NHLBI)

- Based on data from the NHLBI's Framingham Heart Study in its 44-year follow-up of participants and the 20-year follow-up of their offspring...

  — CHD is the predominant cardiovascular event, comprising more than one-half of all such events in men and women under age 75.

  — The lifetime risk of developing CHD after age 40 is 49 percent for men and 32 percent for women.

  — The incidence of CHD in women lags behind men by 10 years for total CHD and by 20 years for more serious clinical events such as MI and sudden death.

  — CHD rates in women after menopause are 2-3 times those of women the same age before menopause.

- 50 percent of men and 63 percent of women who died suddenly of CHD had no previous symptoms of this disease. (Framingham Heart Study, NHLBI)

- 1999 CHD mortality: male deaths — 267,268 (50.5 percent of deaths from CHD); female deaths — 262,391 (49.5 percent of deaths from CHD).

- In 1999 the overall CHD death rate was 195.6. The death rates were 249.4 for white males and 272.6 for black males, and 152.5 for white females and 192.5 for black females.

- 1999 preliminary death rates for CHD were 138.4 for Hispanics, 123.9 for American Indians/Alaska Natives and 115.7 for Asian/Pacific Islanders (CDC/NCHS).

- Among Americans age 20 and older, the age-adjusted prevalence of CHD for non-Hispanic whites is 6.9 percent for men and 5.4 for women; for non-Hispanic blacks it's 7.1 percent for men and 9.0 for women; and for Mexican Americans it's 7.2 percent for men and 6.8 for women. (NHANES III [1988-94], CDC/NCHS)

- Among Americans age 20 and older, the age-adjusted prevalence of MI for non-Hispanic whites is 5.2 percent for men and 2.0 for women; for non-Hispanic blacks it's 4.3 percent for men and 3.3 for women; and for Mexican Americans it's 4.1 percent for men and 1.9 for women. (NHANES III [1988-94], CDC/NCHS)

- The annual rates per 1,000 population of new and recurrent heart attacks in non-black men are 26.3 for ages 65-74, 39.7 for ages 75-84, and 53.6 for age 85 and older. For non-black women in the same age groups the rates are 7.8, 21.0 and 24.2, respectively. For black men the rates are 16.3, 54.9 and 40.8, and for black women the rates are 13.3, 18.3 and 14.1, respectively. (CHS, NHLBI)

- Among American Indians ages 65-74, the annual rates (per 1,000) of incident heart attacks are 6.8 for men and 2.2 for women. (Strong Heart Study [1991-98], NHLBI)
- The average annual CHD incidence rate (per 1,000) in middle-aged Japanese-American men living in Hawaii was 4.6 for ages 45-49, 6.0 for ages 50-54, 7.2 for ages 55-59, 8.8 for ages 60-64, and 10.5 for ages 65-68. (The first 10-year follow-up after the initial examination [1965-68] in the Honolulu Heart Program, NHLBI)
  — During the 19-year follow-up of this study (1966-84), the age-adjusted annual CHD mortality rate (per 1,000) decreased from 4.7 to 2.9, with an estimated annual decline of 2.7 percent. This trend is similar to that reported for U.S. white males of comparable ages in the same period.

Aftermath

- 25 percent of men and 38 percent of women will die within 1 year after having an initial recognized MI. (Framingham Heart Study, NHLBI)
- In part because women have heart attacks at older ages than men do, they're more likely to die from them within a few weeks.
- People who've had a heart attack have a sudden death rate that's 4-6 times that of the general population. (Framingham Heart Study, NHLBI)
- CHD is a prominent cause of death in adults at the peak of their productive lives. (BRFSS [1997], *Morbidity and Mortality Weekly Report (MMWR)*, Vol. 49, No. SS-2, March 24, 2000, CDC/NCHS)
- Depending on their sex and clinical outcome, people who survive the acute stage of a heart attack have a chance of illness and death that's 1.5-15 times higher than that of the general population. The risk of another heart attack, sudden death, angina pectoris, heart failure and stroke — for both men and women — is substantial. (Framingham Heart Study, NHLBI)
- Within 6 years after a recognized heart attack… (Framingham Heart Study, NHLBI)
  — 18 percent of men and 35 percent of women will have another heart attack.
  — 7 percent of men and 6 percent of women will experience sudden death.
  — About 22 percent of men and 46 percent of women will be disabled with heart failure.
- Almost half of men and women under age 65 who have a heart attack (MI) die within 8 years. (Framingham Heart Study, NHLBI)
- About two-thirds of heart attack patients don't make a complete recovery, but 88 percent of those under age 65 are able to return to their usual work. The outlook for people who have an unrecognized attack is about the same or worse. (Framingham Heart Study, NHLBI)

- 1,317,000 males and 945,000 females diagnosed with CHD were discharged from hospitals in 1999. From 1979 to 1999, these discharges increased 29.9 percent for men and 30.5 percent for women.
- CHD is the leading cause of premature, permanent disability in the U.S. labor force, accounting for 19 percent of disability allowances by the Social Security Administration. (Framingham Heart Study, NHLBI)
- In 1998, $10.6 billion was paid to Medicare beneficiaries for CHD ($10,428 per discharge for acute MI; $11,399 per discharge for coronary atherosclerosis and $3,617 per discharge for other CHD). (Health Care Financing Review, Statistical Supplement [2000], HCFA)

Estimated 10-Year CHD Risk in 55-Year-Old Adults According to Levels of Various Risk Factors — Framingham Heart Study
United States
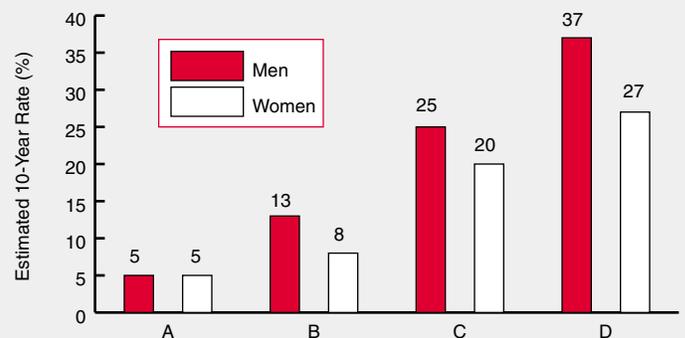
|	A	B	C	D
Blood Pressure (mm Hg)	120/80	140/90	140/90	140/90
Total Cholesterol (mg/dL)	200	240	240	240
HDL Cholesterol (mg/dL)	50	50	40	40
Diabetes	No	No	Yes	Yes
Cigarettes	No	No	No	Yes

mm Hg = millimeters of mercury
mg/dL = milligrams of cholesterol per deciliter of blood

Source: Wilson PWF, et al. Prediction of coronary heart disease using risk factor categories. Circulation. 1998;97:1837-1847.

Annual Number of Americans Having Diagnosed Heart Attack by Age and Sex
United States: 1987-94
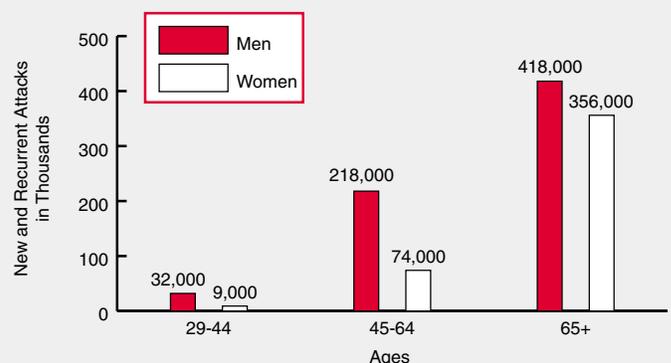
Source: Extrapolated from rates in the NHLBI's ARIC surveillance study, 1987-94. These data don't include silent MIs.

Annual Rate of First Heart Attacks by Age, Sex and Race
United States: 1987-94
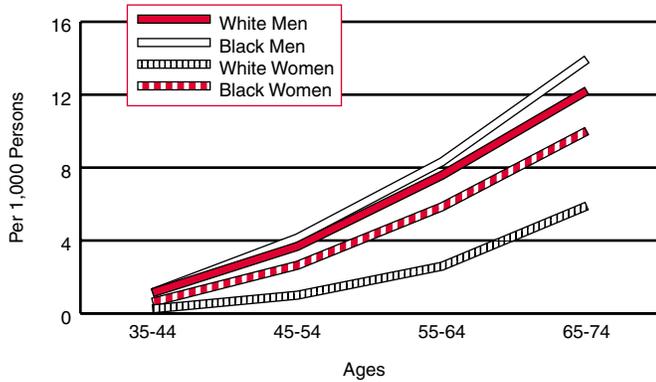
Source: Rates in the NHLBI's ARIC surveillance study, 1987-94.

Prevalence of Coronary Heart Disease by Age and Sex
United States: 1988-94
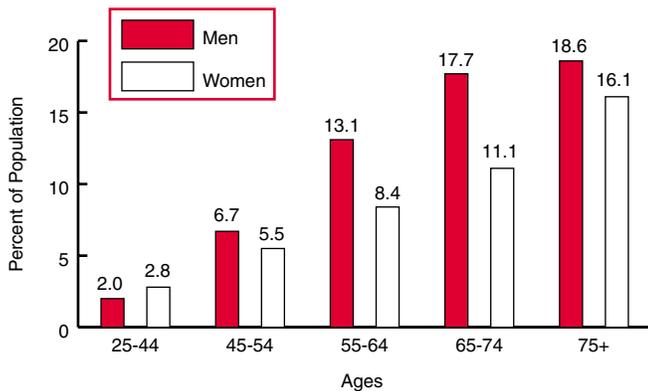
Source: NHANES III (1988-94), CDC/NCHS and the American Heart Association.

Age-Adjusted Death Rates for Coronary Heart Disease, Stroke, Lung and Breast Cancer for White and Black Females
United States: 1999
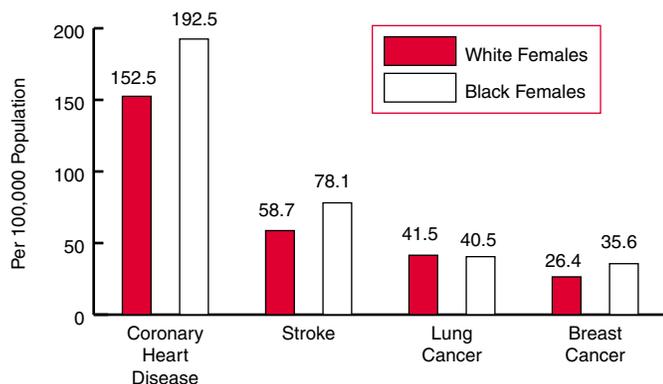
Source: CDC/NCHS and the American Heart Association.

Hospital Discharges* for Coronary Heart Disease by Sex
United States: 1979-99
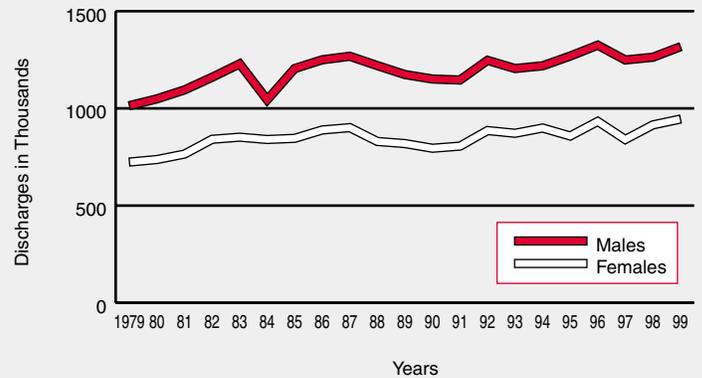
* Hospital discharges include people both living and dead.

Source: CDC/NCHS and the American Heart Association.

Angina Pectoris
(ICD/9 413) (ICD/10 I20)

About 6,400,000 Americans have angina pectoris (chest pain or discomfort due to insufficient blood flow to the heart muscle) — about 2,400,000 males and 4,000,000 females. A small number of deaths due to coronary heart disease are coded as being from angina pectoris. These are included as a portion of total deaths from CHD.

- About 400,000 new cases of stable angina (predictable chest pain on exertion or under mental or emotional stress) and about 150,000 new cases of unstable angina (unexpected chest pain while at rest) occur each year. (Framingham Heart Study, NHLBI)

- 27 percent of men and 14 percent of women will develop angina within 6 years after a recognized heart attack. (Framingham Heart Study, NHLBI)

- Only 20 percent of coronary attacks are preceded by long-standing angina. The percentage is lower if the infarction is silent or unrecognized. (44-year follow-up of participants and 20-year follow-up of their offspring, Framingham Heart Study, NHLBI)

- The age-adjusted prevalence of angina is greater in women than in men. Angina rates in women age 20 and older are 3.9 percent for non-Hispanic white women, 6.2 percent for non-Hispanic black women and 5.5 percent for Mexican-American women. Rates for men in these three groups are 2.6, 3.1 and 4.1 percent, respectively. (NHANES III [1988-94], CDC/NCHS)

- The annual rates per 1,000 population of new and recurrent episodes of angina for non-black men are 44.3 for ages 65-74, 56.4 for ages 75-84, and 42.6 for age 85 and older. For non-black women in the same age groups the rates are 18.8, 30.8 and 19.8, respectively. For black men the rates are 26.1, 52.2 and 43.5, and for black women the rates are 29.4, 37.7 and 15.2, respectively. (CHS, NHLBI)

- About 35,000 males and 47,000 females diagnosed with angina pectoris were discharged from hospitals in 1999.

STROKE

(ICD/9 430-438) (ICD/10 I60-I69)

Stroke killed 167,366 people in 1999 and accounted for about 1 of every 14.3 deaths in the United States. About 47 percent of these deaths occurred out of hospital. Total mention mortality — about 278,000.

- When considered separately from other cardiovascular diseases, stroke ranks as the third leading cause of death, behind diseases of the heart and cancer. (CDC/NCHS)

- On average, someone in the United States suffers a stroke every 53 seconds; every 3.1 minutes someone dies of one.

- Each year, about 600,000 people suffer a new or recurrent stroke. About 500,000 of these are first attacks, and 100,000 are recurrent attacks. (Framingham Heart Study, NHLBI)

- The most common variety of complete stroke is athero-thrombotic brain infarction, which accounts for 61 percent of all strokes (excluding transient ischemic attacks or TIAs). The next most common is cerebral embolus (24 percent). (44-year follow-up of participants and 20-year follow-up of their offspring, Framingham Heart Study, NHLBI)

- Of incident definite or probable strokes reported in the NHLBI's ARIC study, 83 percent were ischemic, 10 percent were intracerebral hemorrhage, and 7 percent were subarachnoid hemorrhage. Among the 178 definite thrombotic brain infarctions, 38 percent were classified as lacunar strokes (in small blood vessels) and twice as many were in blacks as in whites. (*Stroke*. 1999;30:736-743)

- 7.6 percent of ischemic strokes and 37.5 percent of hemorrhagic strokes result in death within 30 days. (*Stroke*. 1999;30:736-743)

- About 4,600,000 stroke survivors (2,300,000 males and 2,300,000 females) are alive today.

- From 1989 to 1999, the stroke death rate fell 13.0 percent, but the actual number of stroke deaths rose 8.6 percent.

Age, Sex, Race and Ethnicity

- According to the NHLBI's Framingham Heart Study…

   — 28 percent of people who suffer a stroke in a given year are under age 65.

   — For people over age 55, the incidence of stroke more than doubles in each successive decade.

   — The chance of having a stroke before age 70 is 1 in 20 for both sexes.

- Stroke is more common in men than in women. In most age groups, more men than women will have a stroke in a given year. At older ages, the incidence is higher in women than in men. More than half of total stroke deaths occur in women.

- 1999 stroke mortality: males — 64,485 deaths (38.5 percent of deaths from stroke); females — 102,881 deaths (61.5 percent of deaths from stroke).

- The 1999 overall death rate for stroke was 61.8. Death rates were 60.0 for white males and 87.4 for black males, 58.7 for white females and 78.1 for black females.

- 1999 preliminary death rates for stroke were 40.0 for Hispanics, 39.7 for American Indians/Alaska Natives and 52.4 for Asian/Pacific Islanders. (CDC/NCHS)

- Based on the NHLBI's ARIC study, the age-adjusted stroke incidence rates (per 1,000 person-years) are 1.78 for white men, 4.44 for black men, 1.24 for white women and 3.10 for black women. Blacks have a 38 percent greater risk of incident (first) strokes than whites. (*Stroke*. 1999;30:736-743)

- Among Americans age 20 and older, the age-adjusted prevalence of stroke for non-Hispanic whites is 2.2 percent for men and 1.5 for women; for non-Hispanic blacks it's 2.5 percent for men and 3.2 for women; and for Mexican Americans it's 2.3 percent for men and 1.3 for women. (NHANES III [1988-94], CDC/NCHS)

- The prevalence of TIAs in men is 2.7 percent for ages 65-69 and 3.6 percent for ages 75-79. (A TIA or transient ischemic attack is a mini-stroke that lasts less than 24 hours.) For women, TIA prevalence is 1.6 percent for ages 65-69 and 4.1 percent for ages 75-79. (CHS, NHLBI)

- The annual rates per 1,000 population of new and recurrent strokes for non-black men are 14.4 for ages 65-74, 24.6 for ages 75-84, and 27.9 for age 85 and older. For non-black women in the same age groups the rates are 6.2, 22.7 and 30.6, respectively. For black men the rates are 11.9, 17.5 and 40.8, and for black women the rates are 16.1, 22.4 and 0.0, respectively. (The 0.0 figure results from a very small sample of black women.) (CHS, NHLBI)

- Compared with Caucasians, young African Americans have 2-3 times the risk of ischemic stroke, and African-American men and women are more likely to die of stroke. (*Stroke*. 1988;19:1-9)

- The annual rates (per 1,000) of new and recurrent strokes in American Indians ages 65-74 are 15.2 for men and 7.9 for women. (Strong Heart Study [1991-98], NHLBI)

- The average annual incidence rates (per 1,000) of stroke in Japanese-American men increased with advancing age from 45-49 to 65-68 at the initial examination: 2.1 to 8.2 for total stroke, 1.5 to 6.6 for thromboembolic stroke; and 0.4 to 1.0 for intracerebral hemorrhage. (During 24 years of follow-up of the Honolulu Heart Program, NHLBI)

   — The age-adjusted annual incidence rate (per 1,000) has declined markedly for total stroke from 5.1 to 2.4; for thromboembolic stroke, from 3.5 to 1.9; and for hemorrhagic stroke, from 1.1 to 0.6. (During the follow-up period 1969-88 of the Honolulu Heart Program, NHLBI)

- Racial and ethnic minority populations **in some age groups** have a higher relative risk of stroke death when compared with the U.S. non-Hispanic white population. Other age groups in these populations have a lower relative risk. (*MMWR*, Vol. 49, No. 5, Feb. 11, 2000, CDC/NCHS)

  — Among non-Hispanic blacks, the relative risk is 4 times higher at ages 35-54, 3 times higher at ages 55-64 and almost 2 times higher at ages 65-74. The risk is only 1.2 times higher at ages 75-84 and slightly lower at age 85 and older.

  — Among American Indians/Alaska Natives, the relative risk is almost 2 times higher at ages 35-44, 1.3 times higher at ages 45-54 and 1.5 times higher at ages 55-64. The risk is slightly less at ages 65-84 and less than half at age 85 and older.

  — Among Asian/Pacific Islanders, the relative risk is 1.3 times higher at ages 35-54 and 1.4 times higher at ages 55-64. The risk is about the same at ages 65-84 and slightly lower at age 85 and older.

  — Among Hispanics, the relative risk is about 1.3 times higher at ages 35-64 and slightly lower at ages 65-74. The risk is about half that of non-Hispanic whites at age 75 and older.

Aftermath

- Stroke is a leading cause of serious, long-term disability in the United States.

- In 1999 there were more than 1,100,000 American adults who reported difficulty with functional limitations, activities of daily living, etc. resulting from stroke. (*MMWR,* Vol. 50, No. 7, Feb. 23, 2001, CDC/NCHS)

- According to the NHLBI's Framingham Heart Study…

  — The length of time to recover from a stroke depends on its severity. 50 to 70 percent of stroke survivors regain functional independence, but 15 to 30 percent are permanently disabled. Institutional care is required by 20 percent at three months after onset.

  — 22 percent of men and 25 percent of women who have an initial stroke die within a year. This percentage is higher among people age 65 and older.

  — 8 percent of men and 11 percent of women will have a stroke within 6 years after a myocardial infarction.

  — 51 percent of men and 53 percent of women under age 65 who have a stroke die within 8 years.

  — 14 percent of persons who survive a first stroke or TIA will experience a recurrence within 1 year.

- 434,000 males and 527,000 females were discharged from hospitals in 1999 after having a stroke. From 1979 to 1999 these discharges increased 28.8 percent.

- In 1998, $3.6 billion ($5,912 per discharge) was paid to Medicare beneficiaries discharged from short-stay hospitals for stroke. (Health Care Financing Review, Statistical Supplement [2000], HCFA)

Annual Rate of First and Recurrent Strokes by Age, Sex and Race
United States: 1987-94 and 1989-96
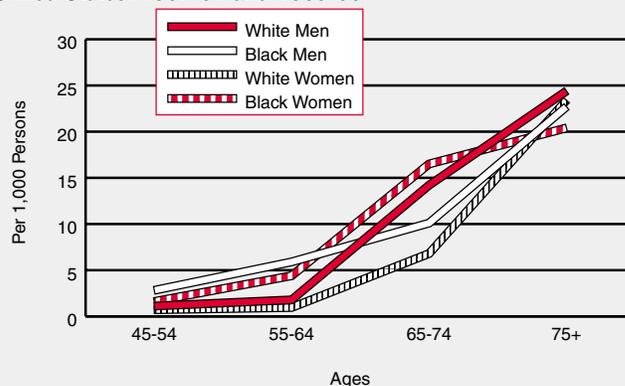
Source: ARIC cohort (1987-94) and CHS (1989-96), NHLBI.

Prevalence of Stroke by Age and Sex
United States: 1988-94
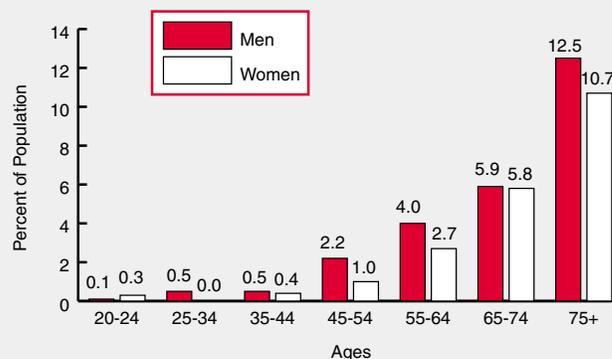

Source: Unpublished data from NHANES III (1988-94), CDC/NCHS.

Estimated 10-Year Stroke Risk in 55-Year-Old Adults According to Levels of Various Risk Factors — Framingham Heart Study
United States
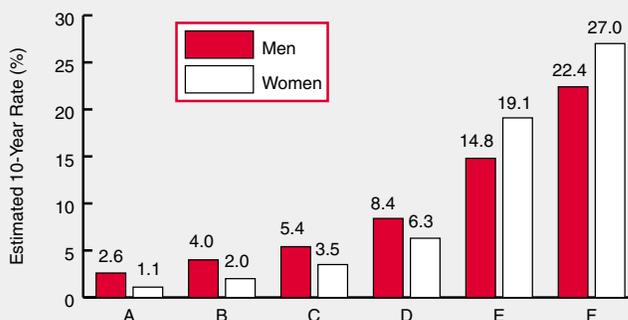
	A	B	C	D	E	F
Systolic BP*	95-105	138-148	130-148	130-148	130-148	130-148
Diabetes	No	No	Yes	Yes	Yes	Yes
Cigarettes	No	No	No	Yes	Yes	Yes
Prior Atrial Fibrillation	No	No	No	No	Yes	Yes
Prior CVD	No	No	No	No	No	Yes

* Blood pressures are in millimeters of mercury (mm Hg).

Source: Wolf PA, et al. Probability of stroke: a risk profile from the Framingham Study. Stroke. 1991;22:312-318.

HIGH
Blood Pressure
(ICD/9 401-404) (ICD/10 I10-I15)

High blood pressure (HBP or hypertension) was listed on death certificates as the primary cause of death of 42,997 Americans in 1999. HBP was listed as a primary or contributing cause of death in about 227,000 of the more than 2,000,000 U.S. deaths that year.

- About 50,000,000 Americans age 6 and older have HBP, defined as systolic pressure of 140 mm Hg or higher or diastolic pressure of 90 mm Hg or higher, or taking anti-hypertensive medicine. (Estimated by the NHLBI from NHANES III [1988-91], CDC/NCHS)

- 1 in 5 Americans (and 1 in 4 adults) has HBP. (NHANES III [1988-94], CDC/NCHS)

- The cause of 90-95 percent of the cases of HBP isn't known; however, HBP is easily detected and usually controllable.

- People with lower educational and income levels tend to have higher levels of blood pressure.

- From 1989 to 1999 the age-adjusted death rate from HBP increased 21 percent, but the actual number of deaths rose 46 percent.

- Of those with HBP, 31.6 percent are unaware they have it; 27.4 percent are on medication and have it controlled; 26.2 percent are on medication but don't have their HBP under control; and 14.8 percent aren't on medication. (Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure [JNC VI, 1991-94])

Age, Sex, Race and Ethnicity

- A higher percentage of men than women have HBP until age 55. From ages 55-74 the percentage of women is somewhat higher; after that a higher percentage of women have HBP than men do. (*Health United States 2001*, CDC/NCHS)

- 1999 HBP mortality: males — 17,194 deaths (40.0 percent of deaths from HBP); females — 25,803 deaths (60.0 percent of deaths from HBP).

- The 1999 overall death rate from HBP was 15.9. Death rates were 12.8 for white males, 46.8 for black males, 12.8 for white females and 40.3 for black females.

- HBP is 2-3 times more common in women taking oral contraceptives, especially in obese and older women, than in women not taking them. (Fifth and Sixth Reports of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure [JNC V and VI])

- About one-half of people who have a first heart attack and two-thirds who have a first stroke have blood pressures higher than 160/95 mm Hg. (Framingham Heart Study, NHLBI)

- The prevalence of HBP among blacks and whites in the southeastern United States is greater and death rates from stroke are higher than among those in other regions.

- As many as 30 percent of all deaths in hypertensive black men and 20 percent of all deaths in hypertensive black women may be attributable to HBP. (JNC V and VI)

- The prevalence of hypertension in blacks in the United States is among the highest in the world. Compared with whites, blacks develop HBP earlier in life and their average blood pressures are much higher. As a result, compared with whites, blacks have a 1.3 times greater rate of nonfatal stroke, a 1.8 times greater rate of fatal stroke, a 1.5 times greater rate of heart disease death and a 4.2 times greater rate of end-stage kidney disease. (JNC V and VI)

- Compared with white women, black women have an 85 percent higher rate of ambulatory medical care visits for hypertension. (Utilization of Ambulatory Medical Care by Women: U.S., 1997-98, NCHS, 2001)

- According to data from the Framingham Heart Study, hypertension preceded the development of congestive heart failure (CHF) in 91 percent of cases. HBP was associated with a two- to threefold risk for the development of CHF. (*JAMA*. 1996;275:1557-1562)

- Among U.S. adults age 20 and older, the age-adjusted prevalence of HBP for non-Hispanic whites is 25.2 percent for men and 20.5 for women; for non-Hispanic blacks it's 36.7 percent for men and 36.6 for women; and for Mexican Americans it's 24.2 percent for men and 22.4 for women. (NHANES III [1988-94], CDC/NCHS)

- The age-adjusted (1980 standard) prevalence of HBP for Asian/Pacific Islanders is 9.7 percent for men and 8.4 percent for women. (National Health Interview Survey, NHIS [1986-90], CDC/NCHS)

- Among American Indians ages 45-74, 26.8 percent of men and 27.5 percent of women have HBP. (Defined as definite hypertension: systolic blood pressure of 160 mm Hg or greater or diastolic blood pressure of 95 mm Hg or greater on one occasion or reported to be currently taking antihypertensive medication.) (Strong Heart Study [1989-92], NHLBI)

- 73 percent of Japanese-American men ages 71-93 have HBP. (Honolulu Heart Program, NHLBI)

- Among Americans age 18 and older, the median percentages who have been told by a professional that they have high blood pressure are (BRFSS [1997], CDC/NCHS):
  - For whites, 23.0 percent.
  - For blacks, 30.9 percent.
  - For Hispanics, 18.6 percent.
  - For Asian/Pacific Islanders, 16.3 percent.
  - For American Indians/Alaska Natives, 20.7 percent.

Discharges

- 172,000 males and 267,000 females diagnosed with HBP were discharged from hospitals in 1999.

Prevalence of High Blood Pressure in Americans Age 25 and Older by Age, Sex and Race
United States: 1988-94

Legend: White Males, Black Males, White Females, Black Females

Percent of Population (y-axis)

Ages (x-axis):
- 25-34: 8.1, 10.6, 1.6, 6.2
- 35-44: 14.3, 29.5, 8.5, 22.9
- 45-54: 29.1, 44.3, 22.6, 48.8
- 55-64: 43.0, 58.0, 41.4, 63.0
- 65-74: 54.9, 65.2, 61.7, 75.6
- 75+: 59.0, 71.3, 76.1, 77.9
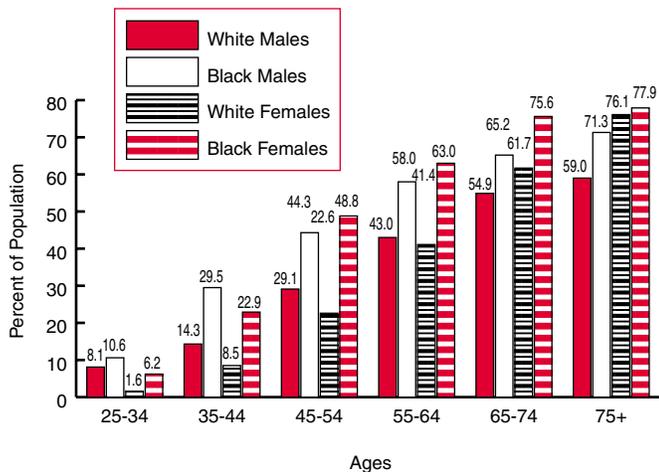
Source: Wolz M, et al. Statement from the National High Blood Pressure Education Program: prevalence of hypertension. Am J Hypertens. 2000;13:103-104. These rates are based on two or more readings.

Mean Systolic Blood Pressure for Women* Ages 25-64 by Education and Race/Ethnicity
United States:1988-94
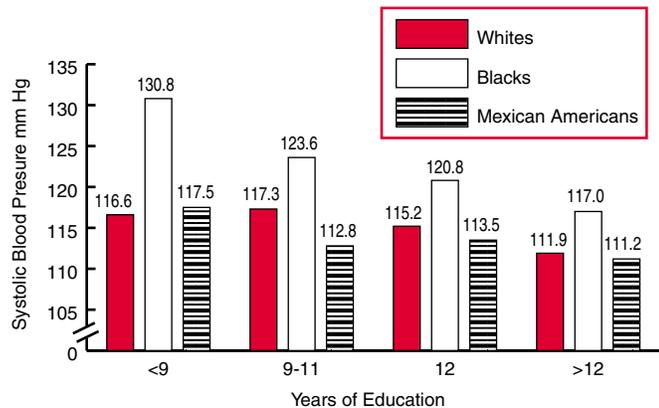
Legend: Whites, Blacks, Mexican Americans

Systolic Blood Presure mm Hg (y-axis)

Years of Education (x-axis):
- <9: 116.6, 130.8, 117.5
- 9-11: 117.3, 123.6, 112.8
- 12: 115.2, 120.8, 113.5
- >12: 111.9, 117.0, 111.2

* For findings on men, see Winkleby MA, et al. "Pathways by which SES and ethnicity influence cardiovascular disease risk factors," *Annals New York Academy of Science*. 1999;896:191-209.

Source: Winkleby MA, et al. Ethnic and socioeconomic differences in cardiovascular disease risk factors for women from the Third National Health and Nutrition Examination Survey, 1988-1994. JAMA. 1998;280:356-362.

Age-Adjusted Prevalence Trends for High Blood Pressure, Ages 20-74 by Race/Ethnicity, Sex and Survey
United States: 1976-80 and 1988-94

Legend: 1976-80, 1988-94

Percent of Population (y-axis)

- Non-Hispanic White Men: 34.2, 25.2
- Non-Hispanic White Women: 25.9, 20.5
- Non-Hispanic Black Men: 44.8, 36.7
- Non-Hispanic Black Women: 46.7, 36.6
- Hispanic Men: 31.0, 24.2
- Hispanic Women: 31.4, 22.4
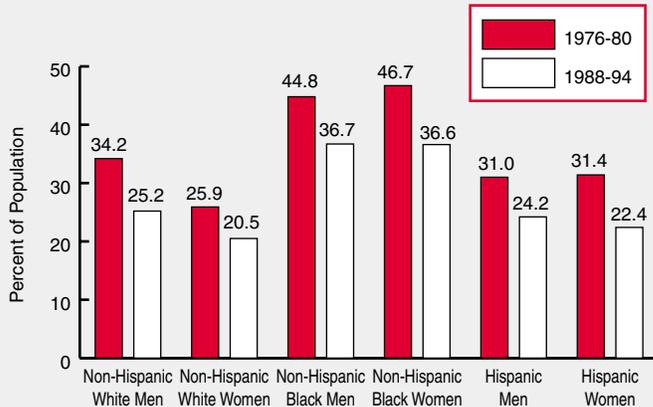
Source: NHANES II (1976-80) and NHANES III (1988-94), CDC/NCHS. Data based on multiple measures of blood pressure.

Estimated Number of Americans Age 25 and Older by Category of High Blood Pressure and Age
United States: 1988-94
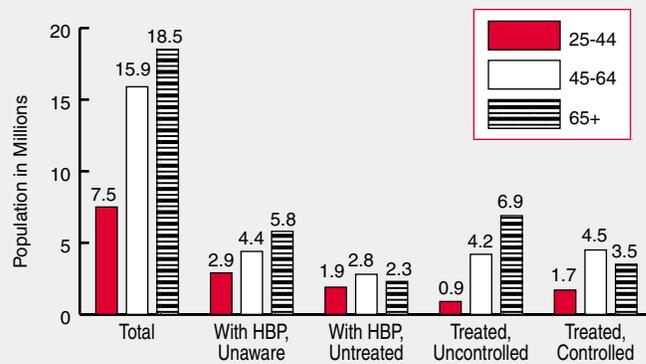
Legend: 25-44, 45-64, 65+

Population in Millions (y-axis)

- Total: 7.5, 15.9, 18.5
- With HBP, Unaware: 2.9, 4.4, 5.8
- With HBP, Untreated: 1.9, 2.8, 2.3
- Treated, Uncontrolled: 0.9, 4.2, 6.9
- Treated, Controlled: 1.7, 4.5, 3.5

Source: Charactistics of patients with uncontrolled hypertension in the United States. NEJM. 2001;345:479-486.

Extent of Awareness, Treatment and Control of High Blood Pressure by Race/Ethnicity
United States: 1988-94
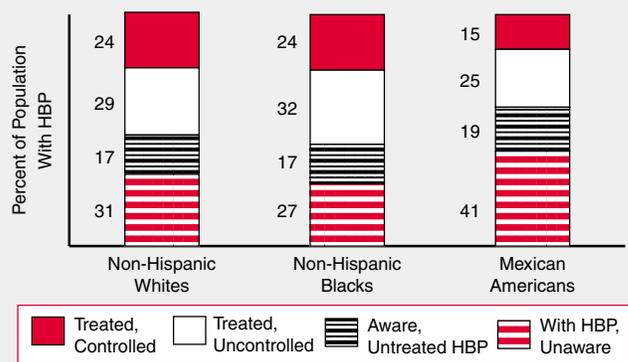
Percent of Population With HBP (y-axis)

Legend: Treated, Controlled; Treated, Uncontrolled; Aware, Untreated HBP; With HBP, Unaware

- Non-Hispanic Whites: 24, 29, 17, 31
- Non-Hispanic Blacks: 24, 32, 17, 27
- Mexican Americans: 15, 25, 19, 41

Source: Charactistics of patients with uncontrolled hypertension in the United States. NEJM. 2001;345:479-486.

End-Stage Renal Disease (ESRD)

(ICD/10 N18.0)

ESRD (also called end-stage kidney disease) is a condition closely related to high blood pressure. ESRD morbidity rates vary dramatically among different age, race, ethnicity and sex population groups. Morbidity rates tend to increase with age, then fall off for the oldest age group. The largest 5-year age group for incidence is patients ages 70-74; for prevalence, it's ages 65-69. The excess CVD risk in people with chronic renal disease is caused, in part, by a higher prevalence of CVD risk factors in this group than in the general population. The main factors include older age, high blood pressure, high blood cholesterol and lipids, diabetes and physical inactivity.

- In 1999, the estimated incidence of new ESRD patients was 89,252.
- 344,094 patients were being treated for ESRD by the end of 1999.
- 66,964 patients died from ESRD in 1999.
- More than 13,590 kidney transplants were performed in 1999.
- Diabetes continues to be the most common reported cause of ESRD.
- The incidence of reported ESRD therapy has almost doubled in the past 10 years. (NHLBI from www.usrds.org Web site)

Age, Sex, Race and Ethnicity

- The average incidence rates for pediatric ESRD are more than twice as high among children 15-19 years as for children 10-14 years. The rates are more than 3 times higher than those for children ages 0-4 and 5-9.
- Children with pediatric ESRD have high transplantation rates. More than 44 percent of children starting therapy received a transplant during the first year of therapy, compared with 10 percent of patients 20-64 years of age at ESRD incidence.
- Treatment of ESRD is more common in men than in women.
- Blacks and Native Americans have much higher rates of ESRD than whites and Asians. Blacks represent 32 percent of treated ESRD patients.

OTHER
Cardiovascular Diseases*

* Mortality, prevalence and death rate data in this section are for 1999 unless otherwise noted. Hospital discharge data are still based on ICD/9 codes.

Arrhythmias (Disorders of Heart Rhythm)

(ICD/9 426, 427) (ICD/10 I46-I49)

Mortality — 39,262. Total mention mortality — about 500,000 of the more than 2,000,000 U.S. deaths. Hospital discharges — 761,000. In 1998, $2.1 billion ($6,047 per discharge) was paid to Medicare beneficiaries for cardiac arrhythmias. (Health Care Financing Review, Statistical Supplement [2000], HCFA)

- Atrial fibrillation and flutter (ICD/9 427.3) (ICD/10 I48). Mortality — 8,338. Total mention mortality — more than 61,500. Prevalence — 2,000,000. Hospital discharges — 384,000. A higher percentage of men than women have atrial fibrillation, but the actual numbers of men and women with it are about equal. About 70 percent of people with atrial fibrillation are between 65 and 85 years old. (*Archives of Internal Medicine*, 1995;155:469-473) About 15 percent of strokes occur in people with atrial fibrillation.
- Tachycardia (ICD/9 427.0,1,2) (ICD/10 I47.0,1,2,9). Mortality — 683. Total mention mortality — more than 6,800. Prevalence in 1996 — 2,300,000. Hospital discharges — 92,000.
  - Paroxysmal supraventricular tachycardia (ICD/9 427.0) (ICD/10 I47.1). Mortality — 27. Hospital discharges — 28,000.
- Ventricular fibrillation (ICD/9 427.4) (ICD/10 I49.0). Mortality — 1,626. Total mention mortality — 21,300. Hospital discharges — 9,000. Although ventricular fibrillation is listed as the cause of relatively few deaths, the overwhelming number of sudden cardiac deaths from coronary disease (which are estimated at about 250,000 per year) are thought to be from ventricular fibrillation.

Arteries, Diseases of

(ICD/9 440-448) (ICD/10 I70-I78) (Includes peripheral vascular disease)

Mortality — 40,788. Total mention mortality — 124,100. Hospital discharges — 287,000.

- Atherosclerosis (ICD/9 440) (ICD/10 I70) is a process that leads to a group of diseases characterized by a thickening of artery walls. Mortality — 14,979. Hospital discharges — 120,000. Atherosclerosis is also a leading cause of many deaths from heart attack and stroke. As such, it accounts for nearly three-fourths of all deaths from CVD. (Framingham Heart Study, NHLBI)

- Aortic aneurysm (ICD/9 441) (ICD/10 I71). Mortality — 15,807. Total mention mortality — 22,400. Hospital discharges — 63,000.
- Other diseases of arteries (ICD/9 442-448) (ICD/10 I72-I78). Mortality — 10,002. Hospital discharges — 104,000.
  — Kawasaki disease (ICD/9 446.1) (ICD/10 M30.3). Mortality — 2. Up to 2,500 cases of Kawasaki disease are diagnosed yearly. Hospital discharges — 15,000, primary plus secondary diagnoses.
    - About 80 percent of patients with Kawasaki disease are under age 5; most are under age 2. Children older than 8 years are rarely affected.
    - Kawasaki disease occurs more often among boys (63 percent) and among those of Asian ancestry.

Bacterial Endocarditis
(ICD/9 421.0) (ICD/10 I33.0)

1998 total mention mortality — 2,212. Hospital discharges — 17,000, primary plus secondary diagnoses.

Cardiomyopathy
(ICD/9 425) (ICD/10 I42)

Mortality — 27,260. Total mention mortality — 53,700. Hospital discharges — 35,000.

- 87 percent of cases are congestive or dilated cardiomyopathy. 50 percent of patients with dilated cardiomyopathy are alive 5 years after their initial diagnosis; 25 percent are alive 10 years after the diagnosis. (*Facts About Cardiomyopathy*, NIH, 1995, NHLBI)
- Recent studies show that 36 percent of young athletes who die suddenly have probable or definite hypertrophic cardiomyopathy.
- Mortality from cardiomyopathy is highest in older persons, men and blacks. (Framingham Heart Study, NHLBI)

Congenital Cardiovascular Defects
(ICD/9 745-747) (ICD/10 Q20-Q28)

Mortality — 4,436. Total mention mortality — about 6,700. Hospital discharges — 54,000.

- About 40,000 babies are born each year with cardiovascular defects. (Metropolitan Atlanta Congenital Defects Program [MACDP], CDC/NCHS)
- At least 35 distinct types of defects are recognized, ranging from simple defects to complex malformations. Common defects diagnosed in infancy include ventricular septal defect (14-17 percent), tetralogy of Fallot (9-12 percent), transposition of the great arteries (10-11 percent), atrioventricular septal defect (4-10 percent) and coarctation of the aorta (8-11 percent). Most defects can be corrected or improved with surgery or catheter-based therapy.
- About 1,000,000 Americans with congenital cardiovascular defects are alive today.

- Mortality associated with congenital defects has been declining. From 1979-97, death rates from all defects declined 39 percent. More than half of deaths occur in infants less than 1 year old. Mortality varies considerably according to type of defect. (*Circulation*. 2001;103: 2376-2381)
- More deaths occur due to cardiac defects than to any other birth defect. (*Genetic Epidemiology*. 1997;14:493-505)
- The 1999 overall death rate for congenital cardiovascular defects was 1.6. Death rates were 1.7 for white males, 2.3 for black males, 1.5 for white females and 1.8 for black females. Crude infant death rates (under 1 year) were 46.4 for white babies and 61.0 for black babies. Some types of defects occur more commonly in females or males.
- From 1989 to 1999, death rates for congenital cardiovascular defects declined 31.5 percent, while the actual number of deaths declined 22.7 percent.

Congestive Heart Failure
(ICD/9 428.0) (ICD/10 I50.0)

Mortality — 50,824; males — 18,987 (37.4 percent of total deaths from CHF); females — 31,837 (62.6 percent of total deaths from CHF). Total mention mortality — 287,200. Hospital discharges — 430,000 males and 532,000 females. From 1979 to 1999, these discharges increased 155.2 percent.

- About 4,790,000 Americans (2,360,000 males and 2,440,000 females) have CHF and are alive today.
- The age-adjusted prevalence of CHF among non-Hispanic whites age 20 and older is 2.3 percent for men and 1.5 percent for women. For non-Hispanic blacks, the percentages are 3.5 for men and 3.1 for women. (NHANES III [1988-94], CDC/NCHS)
- Based on the 44-year follow-up of the NHLBI's Framingham Heart Study...
  — About 550,000 new cases of CHF occur each year.
  — The incidence of CHF approaches 10 per 1,000 population after age 65.
  — 75 percent of CHF cases have antecedent hypertension.
  — About 22 percent of male and 46 percent of female heart attack (MI) victims will be disabled with heart failure within 6 years.
  — 80 percent of men and 70 percent of women under age 65 who have CHF will die within 8 years.
  — After CHF is diagnosed, survival is poorer in men than in women, but fewer than 15 percent of women survive more than 8-12 years. Their 1-year mortality rate is higher with 1 in 5 dying.
  — In people diagnosed with CHF, sudden cardiac death occurs at 6-9 times the rate of the general population.
- From 1979 to 1999, CHF deaths increased 145 percent.
- The 1999 overall death rate for CHF was 18.8. Death rates were 19.4 for white males, 21.9 for black males, 18.2 for white females and 19.4 for black females.

- Hospital discharges for CHF rose from 377,000 in 1979 to 962,000 in 1999.
- The annual rates per 1,000 population of new and recurrent CHF events for non-black men are 21.5 for ages 65-74, 43.3 for ages 75-84, and 73.1 for age 85 and older. For non-black women in the same age groups the rates are 11.2, 26.3 and 64.9, respectively. For black men the rates are 21.1, 52.0 and 66.7, and for black women the rates are 18.9, 33.5 and 48.4, respectively. (CHS, NHLBI)
- In 1998, $3.6 billion ($5,471 per discharge) was paid to Medicare beneficiaries for CHF. (Health Care Financing Review, Statistical Supplement [2000], HCFA)

Prevalence of Congestive Heart Failure by Age and Sex
United States: 1988-94
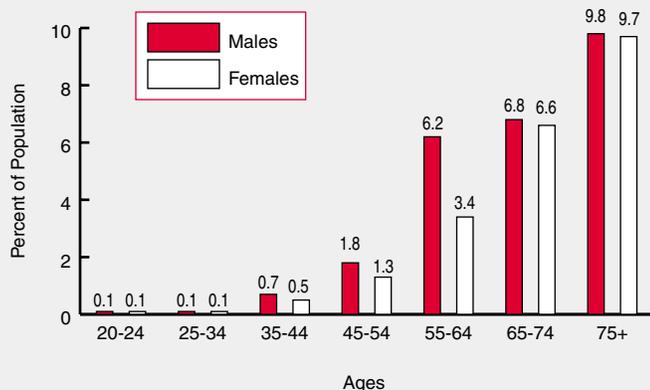
Source: NHANES III (1988-94), CDC/NCHS and the American Heart Association.

Hospital Discharges* for Congestive Heart Failure by Sex
United States: 1979-99

* Hospital discharges include people both living and dead.

Source: CDC/NCHS and the American Heart Association.

Rheumatic Fever/Rheumatic Heart Disease

(ICD/9 390-398) (ICD/10 I00-I09)

Mortality — 3,676; males — 1,042 deaths (28.4 percent of total deaths from RF/RHD); females — 2,634 deaths (71.6 percent of total deaths from RF/RHD). Total mention mortality — about 9,000. Hospital discharges — 45,000.

- In 1950 about 15,000 Americans (adjusted for changes in ICDA codes) died of these diseases compared with about 4,000 today.
- From 1989 to 1999 the death rate from RF/RHD fell 34.6 percent, while actual deaths declined 26.4 percent.
- The 1999 overall death rate for RF/RHD was 1.4. Death rates were 0.9 for white males and 0.8 for black males, 1.7 for white females and 1.2 for black females.
- Many of the 96,000 annual operations on heart valves are related to rheumatic heart disease.
- The incidence of rheumatic fever remains higher in African Americans, Puerto Ricans, Mexican Americans and American Indians. (Hurst W. *The Heart, Arteries and Veins*. 9th ed. New York, NY: McGraw-Hill; 1998)
- In developing countries, rheumatic fever is the most frequent cause of heart disease in the 5-13-year-old group, causing 25-40 percent of all cardiovascular diseases and 33-50 percent of all hospital admissions. (Hurst W. *The Heart, Arteries and Veins*. 9th ed. New York, NY: McGraw-Hill; 1998)

Valvular Heart Disease

(ICD/9 424) (ICD/10 I34-I38)

Mortality — 19,612. Total mention mortality — 39,500. Hospital discharges — 97,000.

- Aortic valve disorders (ICD/9 424.1) (ICD/10 I35). Mortality — 12,212. Total mention mortality — about 11,609. Hospital discharges — 52,000.
- Mitral valve disorders (ICD/9 424.0) (ICD/10 I34). Mortality — 2,895. Total mention mortality — about 6,100. Hospital discharges — 43,000.
  — The NHLBI's Framingham Heart Study reports that prevalence is about 1-2 percent and no more common in women than in men. This was a study of people ages 26-84.
- Pulmonary valve disorders (ICD/9 424.3) (ICD/10 I37). Mortality — 10.
- Tricuspid valve disorders (ICD/9 424.2) (ICD/10 I36). Mortality — 5.

RISK
Factors

Tobacco Smoke

- For the years 1990-94, an average of 430,700 Americans died each year of smoking-related illnesses. The largest portion of these deaths was cardiovascular-related. (*MMWR*, Vol. 46, No. 20, 1997, CDC/NCHS)

- About 1 in 5 deaths from cardiovascular diseases is attributable to smoking. About 37,000-40,000 nonsmokers die from CVD each year as a result of exposure to environmental tobacco smoke.

- Smoking costs Americans an estimated $130 billion annually in medical care. This includes the effects of smoking during pregnancy, lost workdays, lost output from early death and retirement, and fires caused by smoking. (*The Economic Costs of Smoking in the U.S. and Benefits of Comprehensive Tobacco Legislation*. U.S. Treasury Dept.; March 1998)

- Studies show that among people age 18 and older in the United States, smoking has declined by about 44 percent since 1965. Recent data indicate that this downward trend may have leveled off.

- Global mortality from tobacco use is projected to rise from 3 million deaths in 1990 to 10 million in 2030. (World Health Organization. *Combating the tobacco epidemic. WHO's World Health Report, 1999*. Geneva, Switzerland: World Health Organization; 1999)

- According to the WHO, 1 year after quitting, the risk of coronary heart disease decreases by 50 percent, and within 15 years, the relative risk of dying from CHD for an ex-smoker approaches that of a long-time (lifetime) nonsmoker.

- A recent study indicates that passive smoking substantially reduces coronary flow velocity reserve in healthy young adults. (*JAMA*. 2001;286:436-441)

Age, Sex, Race and Ethnicity

- During 1988-96, among people 12-17 years old, the incidence of initiation of first use increased by 30 percent, and first daily use increased by 50 percent. More than 6,000 people under age 18 try a cigarette each day, and each day more than 3,000 persons under age 18 become daily smokers. If trends continue, about 5 million of these people will eventually die from a disease attributed to smoking. (National Household Survey on Drug Abuse, analyzed by CDC/NCHS and the Substance Abuse and Mental Health Services Administration)

- According to 1999 data from the National Youth Tobacco Survey, 29.3 percent of middle school students and 63.5 percent of high school students reported ever smoking cigarettes; 15.4 percent and 41.6 percent reported ever smoking cigars; and 7.1 percent and 18.2 percent reported ever using smokeless tobacco, respectively. (*MMWR*, Vol. 49, No. SS-10, Oct. 13, 2000, CDC/NCHS)

- In 1996 about 15 million children and adolescents under age 18 were exposed to environmental tobacco smoke in the home. (*MMWR*, Vol. 46, No. 44, Nov. 7, 1997, CDC/NCHS)

- About 80 percent of people who use tobacco begin before age 18, with the most common ages of initiation being 14 to 15. (*MMWR*, Vol. 48, No. 31, Aug. 1999, CDC/NCHS)

- White youths ages 18-24, from families with lower educational attainment, report substantially higher smoking rates than black and Mexican-American youths from families with similar educational attainment. 77 percent of young white men and 61 percent of young white women are current smokers compared with 35 percent of minority youth. (*JAMA*. 1999;281:1006-1013)

- From 1980 to 1997, the percentage of high school seniors who smoked in the past month increased almost 20 percent. For males it was 39.2 percent, and for females it was 5.4 percent. For whites it was 37.1 percent, while for blacks there was a 41 percent **decrease**. (Monitoring the Future Study, National Institute on Drug Abuse)

- Current age-adjusted prevalence for Americans age 18 and older shows 25,030,000 men (25.7 percent) and 22,640,000 women (21.5 percent) are smokers, putting them at increased risk of heart attack and stroke. (*Health United States 2001*, CDC/NCHS)

- 1999 National Health Interview Survey (NHIS) data from CDC/NCHS for persons age 18 and older show...
  — Among non-Hispanic whites, 25.5 percent of men and 23.1 percent of women smoke.
  — Among non-Hispanic blacks, 28.7 percent of men and 20.8 percent of women smoke.
  — Among Hispanics, 24.1 percent of men and 12.3 percent of women smoke.
  — Among Asian/Pacific Islanders, 24.3 percent of men and 7.1 percent of women smoke.
  — Among American Indians/Alaska Natives, 40.9 percent of men and 40.8 percent of women smoke.

- Among American Indians ages 45-74, 40.5 percent of men and 29.3 percent of women are current smokers. (Strong Heart Study [1989-92], NHLBI)

- Studies show that smoking prevalence is higher among those with 9-11 years of education (35.4 percent) compared with those with more than 16 years of education (11.6 percent) and is highest among persons living below the poverty level (33.3 percent). (*MMWR*, Vol. 48, No. 43, 1999, CDC/NCHS)

- 47.7 percent of working adults age 17 and older who don't use tobacco report exposure to environmental tobacco smoke at home or at work. (*JAMA*. 1995;273:402-407)

- 37.4 percent of nonsmoking adults are exposed to environmental tobacco smoke at home or at work. The ethnic breakdown is 37.4 percent of non-Hispanic whites, 36.9 percent of non-Hispanic blacks and 35.1 percent of Mexican Americans. (NHANES III [1988-91], CDC/NCHS, *JAMA*. 1996;275:1233-1240)

- The risk of death from CHD increases by up to 30 percent among those exposed to environmental tobacco smoke at home or work.
- The proportion of adults who report that their workplace has an official smoke-free policy ranges from 61.3 percent to 82.1 percent. As the respondents' level of education increases, they are more likely to report working under a smoke-free policy. (BRFSS [1999], CDC/NCHS)

Current Cigarette Smoking for Women* Ages 25-64 by Education and Race/Ethnicity
United States: 1988-94
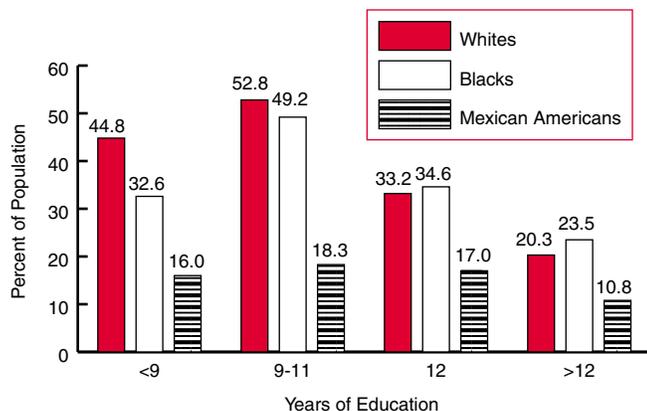
* For findings on men, see Winkleby MA, et al. Pathways by which SES and ethnicity influence cardiovascular disease risk factors. *Annals New York Academy of Science*. 1999;896:191-209.

Source: Winkleby MA, et al. Ethnic and socioeconomic differences in cardiovascular disease risk factors for women from the Third National Health and Nutrition Examination Survey, 1988-1994. JAMA. 1998;280:356-362.

Percentage of High School Students Smoking Cigarettes or Using Smokeless Tobacco Within the Last 30 Days by Race/Ethnicity and Sex
United States: 1999
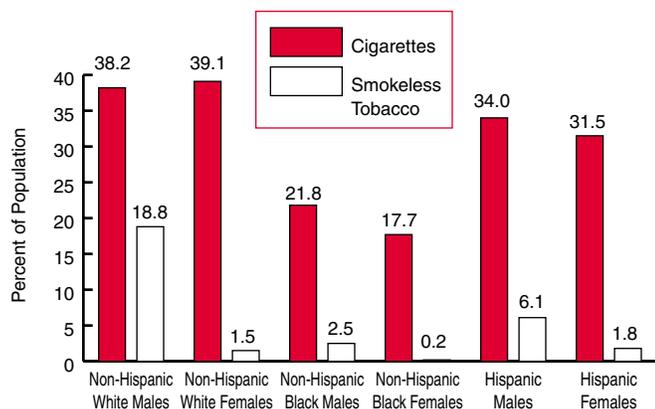
Source: MMWR, Vol. 49, No. SS-5, June 9, 2000, CDC/NCHS (Youth Risk Behavior Surveillance, 1999).

Current Smoking for Men Ages 18-24 by Education and Race/Ethnicity
United States: 1988-94
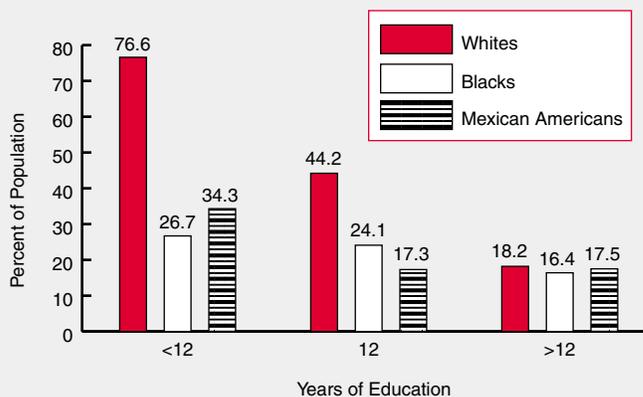
Source: Winkleby MA, et al. Ethnic variation in cardiovascular disease risk factors among children and young adults: findings from the Third National Health and Nutrition Examination Survey, 1988-1994. JAMA. 1999;281:1006-1013.

Current Smoking for Women Ages 18-24 by Education and Race/Ethnicity
United States: 1988-94
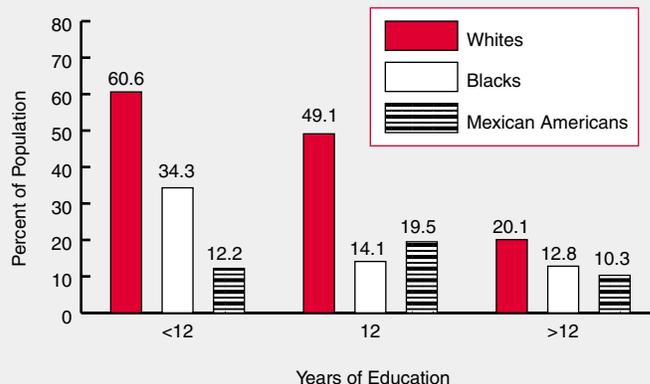
Source: Winkleby MA, et al. Ethnic variation in cardiovascular disease risk factors among children and young adults: findings from the Third National Health and Nutrition Examination Survey, 1988-1994. JAMA. 1999;281:1006-1013.

High Blood Cholesterol and Other Lipids

An estimated 102,340,000 American adults have total blood cholesterol levels of 200 milligrams per deciliter (mg/dL) and higher. Of these, about 41,260,000 have levels of 240 mg/dL or above. In adults, total cholesterol levels of 240 mg/dL or higher are considered high risk. Levels from 200 to 239 mg/dL are considered borderline-high risk. (NHANES III [1988-94], CDC/NCHS)

For information on dietary cholesterol, total fat, saturated fat and other factors that affect blood cholesterol levels, see the Nutrition section on pages 29-30.

- Among children and adolescents ages 4-19 years (NHANES III [1988-94], CDC/NCHS):
  — Females have significantly higher average total cholesterol and low-density lipoprotein (LDL) cholesterol ("bad" cholesterol) than do males.
  — Non-Hispanic black children and adolescents have significantly higher mean total cholesterol, LDL cholesterol and high-density lipoprotein (HDL) cholesterol ("good" cholesterol) levels when compared with non-Hispanic white and Mexican-American children and adolescents.
- Among children and adolescents ages 4-19, the mean total blood cholesterol level is 165 mg/dL. For boys it's 163 mg/dL and for girls it's 167 mg/dL. The racial/ethnic breakdown is (NHANES III [1988-94], CDC/NCHS):
  — For non-Hispanic whites, 162 mg/dL for boys and 166 mg/dL for girls.
  — For non-Hispanic blacks, 168 mg/dL for boys and 171 mg/dL for girls.
  — For Mexican Americans, 163 mg/dL for boys and 165 mg/dL for girls.

Trends in Mean Total Blood Cholesterol Among Adolescents Ages 12-17 by Sex, Race and Survey
United States: 1966-70, 1971-74 and 1988-94
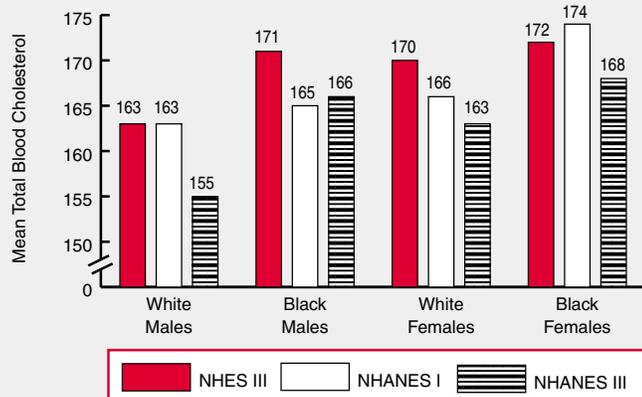
Source: NHES III (1966-70), NHANES I (1971-74), NHANES III (1988-94), CDC/NCHS. Hickman TB, et al. "Distributions and trends of serum lipid levels among United States children and adolescents ages 4-19 years: data from the Third National Health and Nutrition Examination Survey," Prev Med. 1998;27:879-890.

- About 10 percent of adolescents ages 12-19 have total cholesterol levels exceeding 200 mg/dL. (NHANES III [1988-94], CDC/NCHS)
- The prevalence of cholesterol screening during the preceding 5 years increased from 67.3 percent in 1991 to 70.8 percent in 1999. For the 47 states that participated in the BRFSS study in all years from 1991 through 1999, the age-standardized prevalence of high blood cholesterol awareness among persons screened increased from 25.7 percent in 1991 to 28.6 percent in 1999. (BRFSS, *MMWR*, Vol. 50, No. 35;754-758, Sept. 7, 2001, CDC/NCHS)
- A 10-percent decrease in total cholesterol levels may result in an estimated 30 percent reduction in the incidence of CHD. (*MMWR*, Vol. 49, No. 33, Aug. 25, 2000, CDC/NCHS)
- Among Americans age 18 and older, the median percentages who have been told by a professional that they have high blood cholesterol are (BRFSS [1997], *MMWR*, Vol. 49, No. SS-2, March 24, 2000, CDC/NCHS):
  — For whites, 29.7 percent.
  — For blacks, 26.0 percent.
  — For Hispanics, 25.6 percent.
  — For Asian/Pacific Islanders, 27.3 percent.
  — For American Indians/Alaska Natives in Alaska, 26.0 percent; in Oklahoma, 28.6 percent; in Washington, 26.5 percent.
- Studies show that a higher percentage of women than men have total blood cholesterol of 200 mg/dL or higher, beginning at age 50.
- 53,830,000 adult women and 48,180,000 adult men had total blood cholesterol levels of 200 mg/dL or higher in 1999. (NHANES III [1988-94], CDC/NCHS)
- Age-adjusted prevalence among non-Hispanic whites ages 20-74 (NHANES III [1988-94], CDC/NCHS):
  — 52 percent of men and 49 percent of women have total blood cholesterol levels over 200 mg/dL.
  — 18 percent of men and 20 percent of women have total blood cholesterol levels of 240 mg/dL or higher.
- Age-adjusted prevalence among non-Hispanic blacks ages 20-74 (NHANES III [1988-94], CDC/NCHS):
  — 45 percent of men and 46 percent of women have total blood cholesterol levels over 200 mg/dL.
  — 15 percent of men and 18 percent of women have total blood cholesterol levels of 240 mg/dL or higher.
- Age-adjusted prevalence among Mexican Americans ages 20-74 (NHANES III [1988-94], CDC/NCHS):
  — 53 percent of men and 48 percent of women have total blood cholesterol levels over 200 mg/dL.
  — 18 percent of men and 17 percent of women have total blood cholesterol levels of 240 mg/dL or higher.
- Among elderly Japanese-American men, 42 percent have total cholesterol levels of 200 mg/dL or higher or are taking cholesterol-lowering medication. (Honolulu Heart Program, Fourth Examination [1991-93], NHLBI)

- For American Indians ages 45-74, 37.7 percent of men and 37.6 percent of women have total blood cholesterol levels of 200 mg/dL or higher. 8.6 percent of men and 12.7 percent of women have levels of 240 mg/dL or higher. (Strong Heart Study [1989-92], NHLBI)

LDL ("Bad") Cholesterol

- Mean LDL cholesterol levels among children and adolescents ages 12-19 are (NHANES III [1988-94], CDC/NCHS):
  — Among non-Hispanic whites, 91 mg/dL for boys and 100 mg/dL for girls.
  — Among non-Hispanic blacks, 99 mg/dL for boys and 102 mg/dL for girls.
  — Among Mexican Americans, 93 mg/dL for boys and 92 mg/dL for girls.
- The age-adjusted prevalence among Americans age 20 and older with LDL cholesterol levels of 130 mg/dL or higher, which is associated with a higher risk of coronary heart disease, is (NHANES III [1988-94], CDC/NCHS):
  — For non-Hispanic whites, 49.6 percent of men and 43.7 percent of women. (20.4 percent of men and 17.0 percent of women have an LDL cholesterol level of 160 mg/dL or higher.)
  — For non-Hispanic blacks, 46.3 percent of men and 41.6 percent of women. (19.3 percent of men and 18.8 percent of women have an LDL cholesterol level of 160 mg/dL or higher.)
  — For Mexican Americans, 43.6 percent of men and 41.6 percent of women. (16.9 percent of men and 14.0 percent of women have an LDL cholesterol level of 160 mg/dL or higher.)

HDL ("Good") Cholesterol

- Mean HDL cholesterol levels among children and adolescents ages 4-19 are (NHANES III [1988-94], CDC/NCHS):
  — Among non-Hispanic whites, 48 mg/dL for boys and 50 mg/dL for girls.
  — Among non-Hispanic blacks, 55 mg/dL for boys and 56 mg/dL for girls.
  — Among Mexican Americans, 51 mg/dL for boys and 52 mg/dL for girls.
- The age-adjusted prevalence among Americans age 20 and older with HDL cholesterol of less than 40 mg/dL, which is associated with a higher risk of coronary heart disease, is (NHANES III [1988-94], CDC/NCHS):
  — For non-Hispanic whites, 40.5 percent of men and 14.5 percent of women.
  — For non-Hispanic blacks, 24.3 percent of men and 13.0 percent of women.
  — For Mexican Americans, 40.1 percent of men and 18.4 percent of women.

- The risk of myocardial infarction (heart attack) in both men and women is highest at lower HDL cholesterol (HDL-C) levels and higher total cholesterol levels, overall. However, those with lower levels of HDL-C (37 mg/dL or lower in men and 47 mg/dL or lower in women) are at a high risk regardless of their total cholesterol level. Conversely, those with high levels of total cholesterol have lower risks of myocardial infarction when accompanied by higher levels of HDL-C (53 mg/dL or greater in men and 67 mg/dL or greater in women). This suggests the importance of screening for both total and HDL cholesterol levels in adults. (Framingham Heart Study, NHLBI)

Age-Adjusted Prevalence of Americans Age 20 and Older With LDL Cholesterol of 130 mg/dL or Higher by Race/Ethnicity and Sex
United States: 1988-94

Source: NHANES III (1988-94), CDC/NCHS.

Age-Adjusted Prevalence of Americans Age 20 and Older With HDL Cholesterol of 40 mg/dL or Lower by Race/Ethnicity and Sex
United States: 1988-94
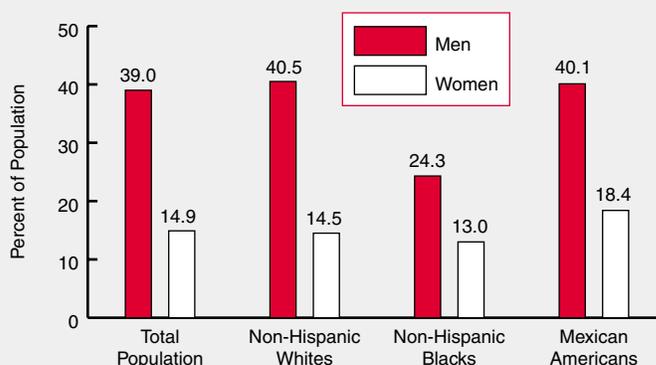
Source: NHANES III (1988-94), CDC/NCHS.

Physical Inactivity

The following data are based on leisure-time physical activity.

- In 1998 about 29 percent of Americans age 18 or older reported no leisure-time physical activity. 27 percent achieved recommended levels of physical activity. 44 percent reported some activity but not enough to achieve recommended levels. (BRFSS [1999], CDC/NCHS, 2000)

  — Men, young people and whites had a higher prevalence of recommended levels of activity compared with women, older people and people from minority races or ethnic groups.

  — People who were college-educated, in high income brackets or living in the West had a higher prevalence of recommended activity.

- The relative risk of CHD associated with physical inactivity ranges from 1.5 to 2.4, an increase in risk comparable to that observed for high blood cholesterol, high blood pressure or cigarette smoking. (*JAMA*. 1995;273:402-407)

- Less-active, less-fit persons have a 30-50 percent greater risk of developing high blood pressure. (Cardiovascular benefits and assessment of physical activity and physical fitness in adults. *Med Sci Sports Exerc*. 1992;24(suppl 6):S201-S220)

Age, Sex, Race and Ethnicity

- Daily enrollment in physical education classes among high school students has declined from 42 percent in 1991 to 29.1 percent in 1999. (*MMWR*, Vol. 47, No. SS-3, Aug. 14, 1998 and *MMWR*, Vol. 49, No. SS-5, June 9, 2000, CDC/NCHS)

- 56.1 percent of high school students were enrolled in physical education classes in 1999, but only 29.1 percent attended classes daily. (*MMWR*, Vol. 49, No. SS-5, June 9, 2000, CDC/NCHS)

- Physical inactivity is more prevalent among women than men, among blacks and Hispanics than whites, among older than younger adults and among the less affluent than the more affluent. (Physical Activity and Health, U.S. Surgeon General's Report, 1996)

- Among American Indians ages 45-74, 16.8 percent of men and 19.6 percent of women report no physical activity during the past year. (Strong Heart Study [1989-92], NHLBI)

- Among adults age 18 and older, the following proportions of people are sedentary (have no leisure-time physical activity) (NHIS [1997], CDC/NCHS):

  — For non-Hispanic whites, 33.3 percent of men and 38.9 percent of women.

  — For non-Hispanic blacks, 46.0 percent of men and 57.1 percent of women.

  — For Hispanics, 49.9 percent of men and 57.1 percent of women.

 — For non-Hispanic Asian/Pacific Islanders, 36.2 percent of men and 49.2 percent of women.

- A recent study of over 72,000 female nurses indicates that moderate-intensity physical activity such as walking is associated with a substantial reduction in risk of total and ischemic stroke when compared with physical activity done at an average or casual pace. (*JAMA*. 2000;283:2961-2967)

- The prevalence of physical **inactivity** during leisure time among Mexican Americans is higher than in the general population. (NHANES III [1988-94], CDC/NCHS, *Am J Public Health*. 2001;91:1254-1257)

  — The prevalence of physical inactivity among those whose main language is English is 15 percent of men and 28 percent of women. This is similar to that of the general population (17 percent of men and 27 percent of women).

  — Those whose main language is Spanish have the highest prevalence of physical inactivity (38 percent of men and 58 percent of women).

Percentage of Students in Grades 9-12 Who Participated in Vigorous or Moderate Physical Activity During the Past 7 Days by Race/Ethnicity and Sex
United States: 1999
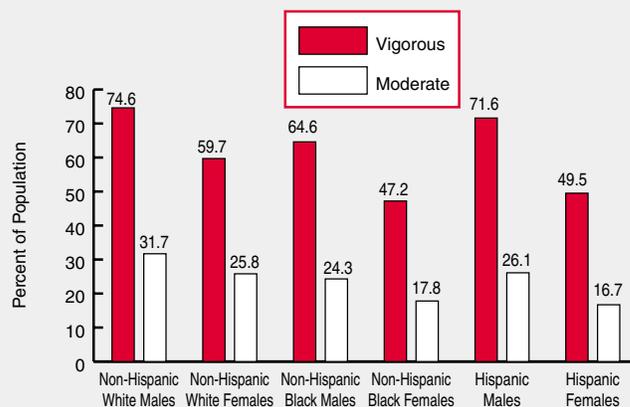
Source: Youth Risk Behavior Surveillance, United States, 1999, MMWR, Vol. 49, No. SS-5, June 9, 2000, CDC/NCHS. "Vigorous activity" is defined as activity causing sweating and hard breathing for at least 20 minutes on 3 or more of the 7 days. "Moderate activity" is defined as activities such as walking or bicycling lasting for at least 30 minutes on 5 or more of the 7 days.

Prevalence of Moderate or Vigorous Physical Activity in Americans Age 20 and Older by Sex, Race/Ethnicity and BMI*
United States: 1988-94

Legend:
- BMI <25
- BMI 25-29.9
- BMI 30+

Data (Percent of Population):
- Non-Hispanic White Men: 46.6, 48.8, 37.3
- Non-Hispanic Black Men: 47.3, 41.8, 44.5
- Mexican-American Men: 35.4, 39.5, 26.4
- Non-Hispanic White Women: 44.2, 30.6, 28.8
- Non-Hispanic Black Women: 29.4, 30.3, 26.8
- Mexican-American Women: 29.5, 28.7, 20.0
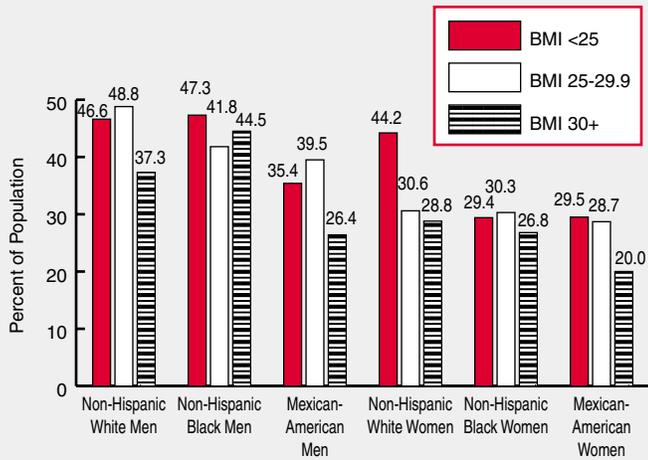
* BMI indicates body mass index: weight in kilograms divided by height in meters squared (kg/m²).

Source: NHANES III (1988-94), CDC/NCHS.

Leisure-time Physical Activity (PA) Patterns Among Overweight Adults by Race/Ethnicity and Sex
United States: 1998

Data (Percent of Population):
- Whites: 66.5, 22.8, 63.5, 20.1
- Blacks: 70.1, 22.6, 62.8, 16.9
- Hispanics: 63.8, 17.1, 52.7, 14.3
- Others: 68.4, 23.0, 63.5, 20.6

Race/Ethnicity and Sex

Legend:
- % of Men using PA to lose weight
- % of Women using PA to lose weight
- % of Men meeting PA guidelines
- % of Women meeting PA guidelines
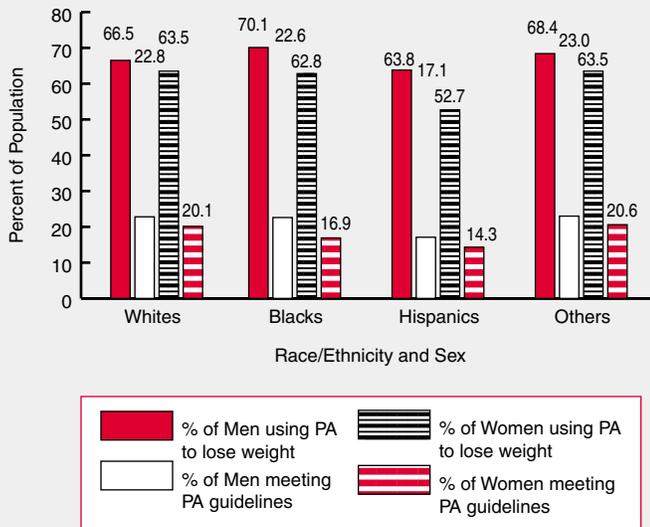
Source: BRFSS, 1998, MMWR, Vol. 49, No. 15;326-330, April 21, 2000, CDC/NCHS.

Overweight and Obesity

Using a body mass index (BMI) of 25.0 or higher as "overweight" and a BMI of 30.0 or higher as "obese," 108,330,000 Americans age 20 and older are considered overweight (56,350,000 men and 51,980,000 women). Of these, 44,250,000 are considered obese (18,680,000 men and 25,570,000 women). In addition, an estimated 5,030,000 children ages 6-17 are considered overweight (based on the 95th percentile of BMI values in the 2000 CDC growth chart for the U.S.). (NHANES III [1988-94], CDC/NCHS)

- Using the 95th percentile of BMI values, the prevalence of overweight among American children ages 6-11 is (NHANES III [1988-94], CDC/NCHS):
    — For non-Hispanic whites, 10.3 percent of boys and 9.2 percent of girls.
    — For non-Hispanic blacks, 11.9 percent of boys and 16.4 percent of girls.
    — For Mexican Americans, 17.4 percent of boys and 14.3 percent of girls.
- Using the 95th percentile of BMI values, the prevalence of overweight among American adolescents ages 12-17 is (NHANES III [1988-94], CDC/NCHS):
    — For non-Hispanic whites, 11.1 percent of boys and 8.5 percent of girls.
    — For non-Hispanic blacks, 10.7 percent of boys and 15.7 percent of girls.
    — For Mexican Americans, 14.6 percent of boys and 13.7 percent of girls.
- Based on preliminary data from the 1999 NHANES IV, there seems to be an increase of 2-3 percent in the number of overweight children and adolescents, compared with data from NHANES III. (CDC/NCHS, March 2001)
- Each year an estimated 300,000 U.S. adults die of causes related to obesity. (BRFSS, CDC/NCHS, *JAMA*. 1999;282:1530-1538)
- Among Americans age 18 and older, the following people are overweight (defined as a BMI of 25 kg/m² or higher) (NHIS [1997], CDC/NCHS):
    — For non-Hispanic whites, 62.4 percent of men and 43.0 percent of women.
    — For non-Hispanic blacks, 64.1 percent of men and 64.5 percent of women.
    — For Hispanics, 64.7 percent of men and 56.8 percent of women.
    — For non-Hispanic Asian/Pacific Islanders, 35.2 percent of men and 25.2 percent of women.
- Among Americans age 18 and older, the median percentages of obesity are (defined as a BMI greater than 30 kg/m²) (BRFSS [1997], CDC/NCHS):
    — For whites, 15.6 percent.
    — For blacks, 26.4 percent.
    — For Hispanics, 18.2 percent.
    — For Asian/Pacific Islanders, 4.8 percent.
    — For American Indians/Alaska Natives, 30.1 percent.

- Among Americans ages 20-74 (with a BMI of 25.0 or higher to indicate overweight and a BMI of 30.0 or higher to indicate obesity), the age-adjusted prevalences are (NHANES III [1988-94], CDC/NCHS):
  - For non-Hispanic whites, 61.5 percent of men and 46.8 percent of women are overweight. 20.8 percent of men and 23.2 percent of women are obese.
  - For non-Hispanic blacks, 58.4 percent of men and 68.3 percent of women are overweight. 21.3 percent of men and 38.2 percent of women are obese.
  - For Mexican Americans, 69.3 percent of both men and women are overweight. 24.8 percent of men and 36.1 percent of women are obese.
- Among American Indians ages 45-74, 25.9 percent of men and 31.3 percent of women are overweight (defined as a BMI of 27.8-31.0 for men and 27.3-32.2 for women). 35.5 percent of men and 41.2 percent of women are obese (defined as a BMI of 31.1 or higher for men and 32.3 or higher for women). (Strong Heart Study [1989-92], NHLBI)
- The prevalence of obesity (BMI of 30 kg/m^2 or higher) was 19.8 percent in 2000. Mississippi had the highest prevalence of obesity (24.3 percent) and Colorado had the lowest (13.8 percent). (*JAMA*. 2001;286:1195-1200)
- An expert group convened by the World Health Organization in June 1997 found that overweight and obesity represent a rapidly growing threat to the health of populations in an increasing number of countries worldwide. WHO recognized obesity as a disease that is prevalent in both developing and developed countries and that affects children and adults alike.

## Prevalence of Overweight Among Students in Grades 9-12 by Sex and Race/Ethnicity
United States: 1999
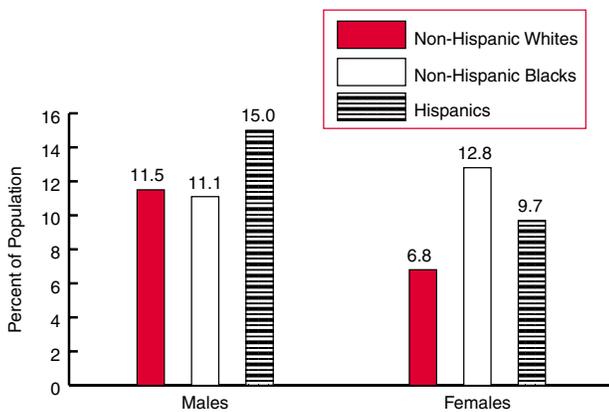
Source: NHANES I (1971-74), BMI 95th percentile. Youth Risk Behavior Surveillance, United States, 1999, MMWR, Vol. 49, No. SS-5, June 9, 2000, CDC/NCHS.

Mean BMI for Women* Ages 25-64 by Education and Race/Ethnicity
United States: 1988-94
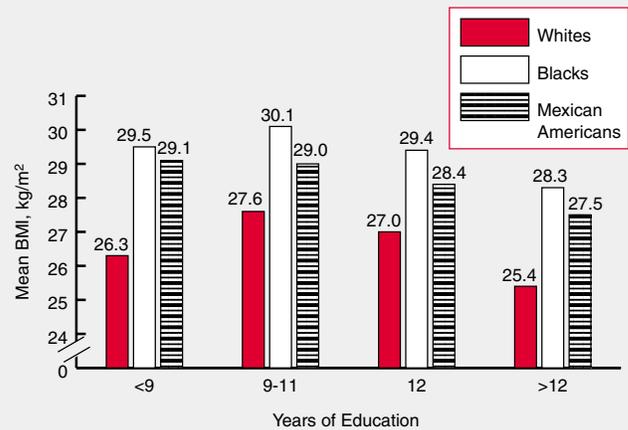
* For findings on men, see Winkleby MA, et al. Pathways by which SES and ethnicity influence cardiovascular disease risk factors. *Annals New York Academy of Science*. 1999;896:191-209.

Source: Winkleby MA, et al., Ethnic and socioeconomic differences in cardiovascular disease risk factors for women from the Third National Health and Nutrition Examination Survey, 1988-1994. JAMA. 1998;280:356-362.

Age-Adjusted Prevalence of Overweight* in Americans Ages 20-74 by Sex and Survey
United States: 1960-62, 1971-74, 1976-80 and 1988-94
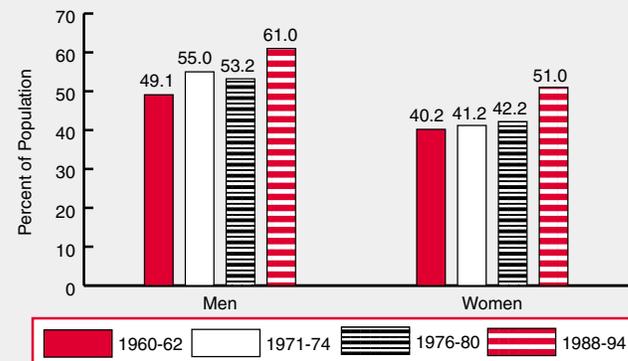
* Overweight is defined as a BMI of 25.0 or higher.

Source: Respective health examination surveys, CDC/NCHS and the American Heart Association.

# Diabetes Mellitus

(ICD/9 250) (ICD/10 E10-E14)

In 1999 diabetes killed 68,399 Americans. Males — 31,150 deaths (45.5 percent of total deaths from diabetes); females — 37,249 deaths (54.5 percent of total deaths from diabetes). Total mention mortality — 202,000.

- 10,600,000 Americans have physician-diagnosed diabetes (about 4,900,000 males and 5,700,000 females). (NHANES III [1988-94], CDC/NCHS, *Diabetes Care*. 1998;21:518-524)

- The prevalence of diabetes rose from 4.9 percent in 1990 to 6.5 percent in 1998, an increase of 33.3 percent. Increases were observed in both sexes, all ages, all ethnic groups, all education levels, and nearly all states. (BRFSS [1990-98], CDC/NCHS, *Diabetes Care*. 2000;23:1278-1283)

- The prevalence of diabetes was 7.3 percent in 2000. Mississippi had the highest prevalence of diabetes (8.8 percent) and Alaska had the lowest (4.4 percent). (*JAMA*. 2001;286:1195-1200)

- 798,000 new cases of non-insulin dependent diabetes are diagnosed every year according to estimates of the National Institute of Diabetes, Digestive, and Kidney Diseases.

- 545,000 Americans diagnosed with diabetes mellitus were discharged from hospitals in 1999. Of these, about 262,000 were males and 283,000 were females.

- The 1999 overall death rate from diabetes was 25.2. Death rates were 25.8 for white males, 48.6 for black males, 20.5 for white females and 50.4 for black females.

- Two-thirds of people with diabetes mellitus die of some form of heart or blood vessel disease.

- The age-adjusted prevalence of physician-diagnosed diabetes in adults age 20 and older is (NHANES III [1988-94], CDC/NCHS):
  - For non-Hispanic whites, 5.4 percent of men and 4.7 percent of women.
  - For non-Hispanic blacks, 7.6 percent of men and 9.5 percent of women.
  - For Mexican Americans, 8.1 percent of men and 11.4 percent of women.

- Among Americans age 18 and older, the median percentages who have be told by a professional that they have diabetes are (BRFSS [1997], CDC/NCHS):
  - For whites, 4.4 percent.
  - For blacks, 7.6 percent.
  - For Hispanics, 5.5 percent.
  - For Asian/Pacific Islanders, 4.6 percent.
  - For American Indians/Alaska Natives, 7.6 percent.

- Among American Indians ages 45-74, 43.5 percent of men and 52.4 percent of women have diabetes mellitus. Also, 14.2 percent of men and 17.4 percent of women have impaired glucose tolerance. (Strong Heart Study [1989-92], NHLBI)

- 17 percent of Japanese-American men ages 71-93 have diabetes. In addition, 19 percent have unrecognized diabetes, and 32 percent have impaired glucose tolerance. (Honolulu Heart Program [1991-93], NHLBI)

- The risk of diabetes for Mexican Americans and non-Hispanic blacks is almost twice that for non-Hispanic whites. (NHANES III [1988-94], CDC/NCHS, *Diabetes Care*. 1998;21:518-524)

- Compared with white women, black women have 138 percent higher rates of ambulatory medical care visits for diabetes. (Utilization of Ambulatory Medical Care by Women: U.S., 1997-98. NCHS, 2001)

- An estimated 5,600,000 Americans have **undiagnosed diabetes** — about 3,000,000 men and 2,600,000 women.

- The following age-adjusted prevalence of **undiagnosed diabetes** in Americans age 20 and older uses American Diabetes Association criteria of fasting plasma glucose of 126 mg/dL or more (NHANES III [1988-94], CDC/NCHS):
  - For non-Hispanic whites, 3.0 percent of men and 2.1 percent of women.
  - For non-Hispanic blacks, 2.8 percent of men and 4.7 percent of women.
  - For Mexican Americans, 5.8 percent of men and 3.9 percent of women.

- An estimated 13,800,000 Americans have **impaired fasting glucose** — about 8,400,000 men and 5,500,000 women.

- The following age-adjusted prevalence of **impaired fasting glucose** among Americans age 20 and older uses American Diabetes Association criteria of fasting plasma glucose of 110 to less than 126 mg/dL (NHANES III [1988-94], CDC/NCHS):
  - For non-Hispanic whites, 9.4 percent of men and 4.8 percent of women.
  - For non-Hispanic blacks, 8.0 percent of men and 6.8 percent of women.
  - For Mexican Americans, 12.1 percent of men and 6.7 percent of women.

- The prevalence of diabetes in adults globally was estimated to be 4.0 percent in 1995 and was predicted to rise to 5.4 percent by the year 2025. The number of adults with diabetes in the world is estimated to rise from 135 million in 1995 to 300 million in 2025. (*Diabetes Care*. 1998;21:1414-1431)
  - It's projected that the number of people with diabetes will increase 42 percent, from 51 million to 72 million, in developed countries and 170 percent, from 84 million to 228 million, in developing countries.
  - The majority of people with diabetes in developing countries is projected to be younger, ages 45-64, while those in developed countries will be age 65.
  - Diabetes will be increasingly concentrated in urban areas, with the greater burden of disease among women.

Age-Adjusted Prevalence of Physician-Diagnosed Diabetes in Americans Age 20 and Older by Sex and Race/Ethnicity
United States: 1988-94
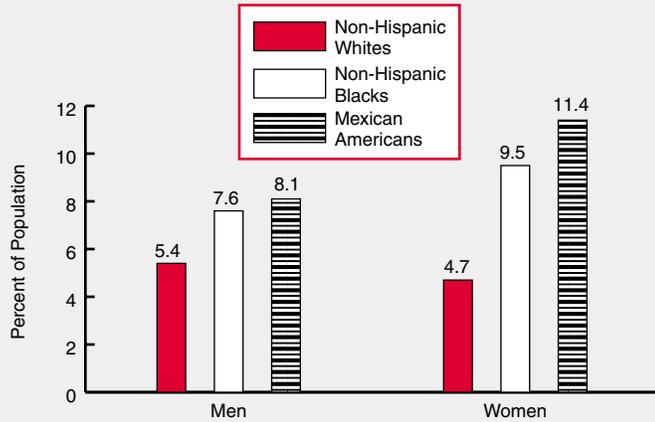
Source: Harris MI, et al. Prevalence of diabetes, impaired fasting glucose, and impaired glucose tolerance in U.S. adults, the Third National Health and Nutrition Examination Survey, 1988-1994. Diabetes Care. 1988;21:518-524.

Prevalence of Non-Insulin Dependent Diabetes in Women* Ages 25-64 by Education and Race/Ethnicity
United States: 1988-94
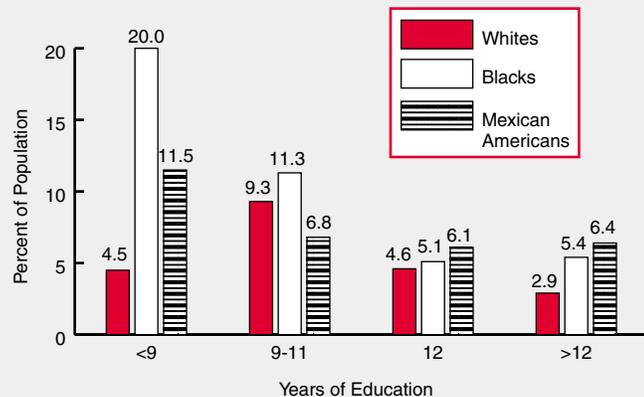
* For findings on men, see Winkleby MA, et al. Pathways by which SES and ethnicity influence cardiovascular disease risk factors. *Annals New York Academy of Science.* 1999;896:191-209.

Source: Winkleby MA, et al. Ethnic and socioeconomic differences in cardiovascular disease risk factors for women from the Third National Health and Nutrition Examination Survey, 1988-1994. JAMA. 1998;280:356-362.

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. They also may aid blood clotting, oxidation, maintaining a normal heart rhythm and other effects. A poor diet, on the other hand, contributes to high blood pressure, high blood cholesterol and excess body weight. Overweight and obesity in turn contribute to diabetes, cholesterol disorders and high blood pressure.

The American Heart Association recommends a diet low in saturated fat, *trans* fat, cholesterol and sodium. It should be high in vegetables, fruits, whole grains, legumes, fat-free or low-fat dairy products, and dietary fiber. The following data support these recommendations.

- Between 1965 and 1991 among U.S. adults age 18 and older, total daily calories declined from 2,049 to 1,807, but then rebounded to 2,000 calories in 1996. This contributed to the marked increase in obesity levels in the past decade. (*Prev Med.* 2001;32:245-254)

- Between 1965 and 1996 among adults, total fat as a proportion of daily calorie intake fell steadily from 39.1 to 33.1 percent. Saturated fat fell from 14.4 to 11.0 percent. However, total calorie intake increased between 1991 and 1996. Over the same period daily total fat consumption rose from 70.9 grams (g) to 74.8 g. (*Prev Med.* 2001;32: 245-254)

  — Total fat intake (saturated, *trans*, monounsaturated, polyunsaturated) should be less than 30 percent of total daily calories.

  — Saturated fat and *trans* fat should not exceed 10 percent of total daily calories for healthy people.

  — Saturated fat should be less than 7 percent of total daily calories for people with coronary heart disease, diabetes or high LDL cholesterol.

  — The recommended daily intake of total fat and saturated fat (in grams) for adults depends on total calories and presence of risk factors. (See our Web site entry, **americanheart.org.** Click on "Heart & Stroke Encyclopedia," then "F," then "Fat.")

- The average daily intake of total fat in the United States is 81.4 grams (96.5 g for males and 67.3 g for females). (NHANES III [1988-94], CDC/NCHS)

  — For non-Hispanic whites the average is 82.7 grams (99.0 g for males and 67.4 g for females).

  — For non-Hispanic blacks the average is 82.0 grams (94.6 g for males and 71.2 g for females).

  — For Mexican Americans the average is 77.6 grams (88.0 g for males and 66.5 g for females).

- The average daily intake of saturated fat in the U.S. is 27.9 grams (33.1 g for males and 23.0 g for females). (NHANES III [1988-94], CDC/NCHS)
  — For non-Hispanic whites the average is 28.4 grams (34.1 g for males and 23.1 g for females).
  — For non-Hispanic blacks the average is 27.5 grams (31.7 g for males and 23.8 g for females).
  — For Mexican Americans the average is 26.7 grams (30.1 g for males and 23.1 g for females).
- The proportion of fat calories from beef, pork, dairy products and eggs fell from 50 percent in 1965 to 33 percent in 1994-96. The proportion of fat calories from poultry increased from 4 percent to 7 percent. Calories from fruits and vegetables rose from 8 percent to 13 percent. (*Prev Med*. 2001;32:245-254)
- In 1994-96, pizza, Mexican food, Chinese food, hamburgers, French fries and cheeseburgers accounted for 10.8 percent of total fat intake. These six foods accounted for only 1.9 percent of fat intake in 1965. (*Prev Med*. 2001;32:245-254)
- The major sources of saturated fat in the diet are red meat, butter, whole milk and eggs. Intake of these foods has fallen markedly since 1965. The decline in whole milk consumption from 21.3 gallons in 1972-76 to 8.2 gallons in 1997 accounts for most of the reduction in saturated fat. (*Prev Med*. 2001;32:245-254)
- The recommended daily intake of dietary cholesterol for adults is less than 300 mg. The average daily intake of dietary cholesterol in the U.S. is 269.6 milligrams (mg). For males it's 323.5 mg and for females it's 218.9 mg. (NHANES III [1988-94], CDC/NCHS)
  — For non-Hispanic whites the average is 259.3 milligrams (312.6 mg for males and 209.1 mg for females).
  — For non-Hispanic blacks the average is 297.9 milligrams (358.8 mg for males and 245.6 mg for females).
  — For Mexican Americans the average is 316.2 milligrams (365.9 mg for males and 263.8 mg for females).
- The recommended daily intake of dietary fiber is 25 grams or more. Americans consume a daily average of 15.6 grams of dietary fiber (17.8 g for males and 13.6 g for females). (NHANES III [1988-94], CDC/NCHS)
  — For non-Hispanic whites the average is 15.8 grams (18.1 g for males and 13.7 g for females).
  — For non-Hispanic blacks the average is 13.4 grams (15.0 g for males and 12.0 g for females).
  — For Mexican Americans the average is 18.5 grams (21.0 g for males and 15.9 g for females).
- Only 22.7 percent of adults consumed fruits and vegetables at least 5 times a day in 1996. This was an increase from 19.0 percent in 1990. (BRFSS [1990-96], CDC/NCHS)
- The highest proportion of adults who consumed fruits and vegetables at least 5 times a day were those 65 years and older, whites, college graduates, those actively engaged in leisure-time physical activity, and nonsmokers. (*Prev Med*. 2001;32:245-254)

- The percentage of men who consumed fruits and vegetables at least 5 times a day increased from 16.5 percent in 1990 to 19.1 percent in 1996. The percentage of women increased from 21.3 percent in 1990 to 26.2 percent in 1996. (*Am J Public Health*. 2000;90:777-781)
- From 1990 to 1996, the percentage of obese adults who consumed at least 5 servings of fruits and vegetables a day dropped from 16.8 percent to 15.4 percent. (*Prev Med*. 2001;32:245-254)
- Recent studies support the intake of up to 9 servings of fruits and vegetables per day. (Appel, et al., *NEJM* 1997; 336:1117-1124)

QUALITY
of Care

The National Committee for Quality Assurance has chosen 5 quality-of-care performance measures related to preventing and treating cardiovascular diseases (The State of Managed Care Quality, 2000, NCQA):

- Advising smokers to quit
- Use of beta blockers after a heart attack
- Cholesterol screening in patients with coronary heart disease
- Cholesterol control in patients with coronary heart disease
- Control of high blood pressure

Performance data for these indicators apply to patients who receive their medical care from providers in managed care plans in the United States. Evidence supports the contention that the quality of care may be better in managed care settings than in other settings. Improvements in the quality of care measured by these performance indicators would be associated with substantial reductions in morbidity and mortality related to cardiovascular diseases.

Advising smokers to quit

- In 1999, 65.3 percent of smokers were advised to quit, an increase from 61.0 percent of smokers in 1996.
- The 90th percentile benchmark was 73 percent of smokers. If all practices performed at this level, an estimated 2.7 million additional smokers would be advised to quit and 82,000 additional smokers would actually quit smoking. This would lead to substantial reductions in smoking-related morbidity, mortality (683 fewer deaths per year) and healthcare costs.

Use of beta blockers after a heart attack

- In 1999, 85.0 percent of heart attack survivors were receiving a beta blocker at the time of discharge from the hospital, an increase from 62.2 percent in 1996. If all practices performed at the 90th percentile level (96 percent), an additional 4,000 deaths could be avoided each year.

Cholesterol screening in patients with coronary heart disease

- In 1999, 68.9 percent of patients hospitalized for heart attack, bypass surgery or angioplasty were screened for LDL cholesterol between 60 and 365 days following discharge. This proportion represented an increase from 59.1 percent in 1998, the first year this performance indicator was used. The 90th percentile benchmark was 83 percent.

Cholesterol control in patients with coronary heart disease

- In 1999, 45.3 percent of patients hospitalized for heart attack, bypass surgery or angioplasty were treated with an LDL cholesterol goal of less than 130 mg/dL. The 90th percentile benchmark was 64.4 percent.
- Note that this treatment goal is less aggressive than the goal endorsed by the American Heart Association and the National Cholesterol Education Program (less than 100 mg/dL). Hence, it's likely that control to the AHA and NCEP goal is worse than suggested here.

Control of high blood pressure

- In 1999 only 39.0 percent of adults with high blood pressure were controlled to levels less than 140/90 mm Hg. The 90th percentile performance goal was 47.9 percent.

MEDICAL
Procedures, Facilities and Costs

From 1979 to 1999, the number of cardiovascular operations and procedures increased 413 percent.

Cardiac Catheterization

- From 1979 to 1999, the number of cardiac catheterizations increased 355 percent.
- In the United States, an estimated 1,359,000 inpatient cardiac catheterizations were performed in 1999.
- 472,000 ambulatory (outpatient) surgical procedures for cardiac catheterization were performed in 1996. 298,000 of them were done on males and 175,000 on females.

Coronary Artery Bypass Surgery

In the United States in 1999, the NCHS estimates that 571,000 of these procedures were performed on 355,000 patients. These numbers represent both code and vessel data. Thus it's impossible to determine the average number of vessels per patient.

Heart Transplants

In 2000, 2,198 heart transplants were performed in the United States. Currently there are 260 transplant centers in the United States, 196 of which perform heart transplants.

- It's estimated that each year thousands of Americans would benefit from a heart transplant.
- In the United States 73 percent of heart transplant patients are male, 77 percent are white, 19 percent are ages 35-49, and 51 percent are ages 50-64.
- 84 percent of patients survived 1 year, based on heart transplants performed from 1994 to May 2000. The 3-year survival rate was about 77 percent, and the 5-year survival rate was 69 percent.

Trend in Heart Transplants
United States: 1968-2000
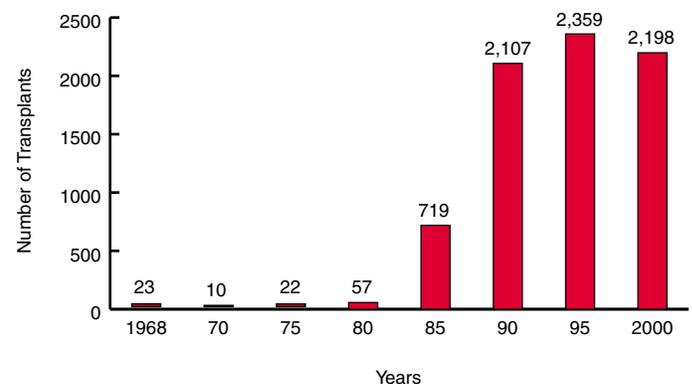
Source: United Network for Organ Sharing (UNOS), scientific registry data.

Percutaneous Transluminal Coronary Angioplasty (PTCA)

- An estimated 601,000 PTCA procedures were performed in 1999 in the United States. From 1987 to 1999 the number of procedures increased 285 percent and the number of patients increased 286 percent.
- In 1999, 66 percent of PTCA procedures were performed on men; 48 percent were performed on people over age 65.

Trends in Cardiovascular Operations and Procedures
United States: 1979-99
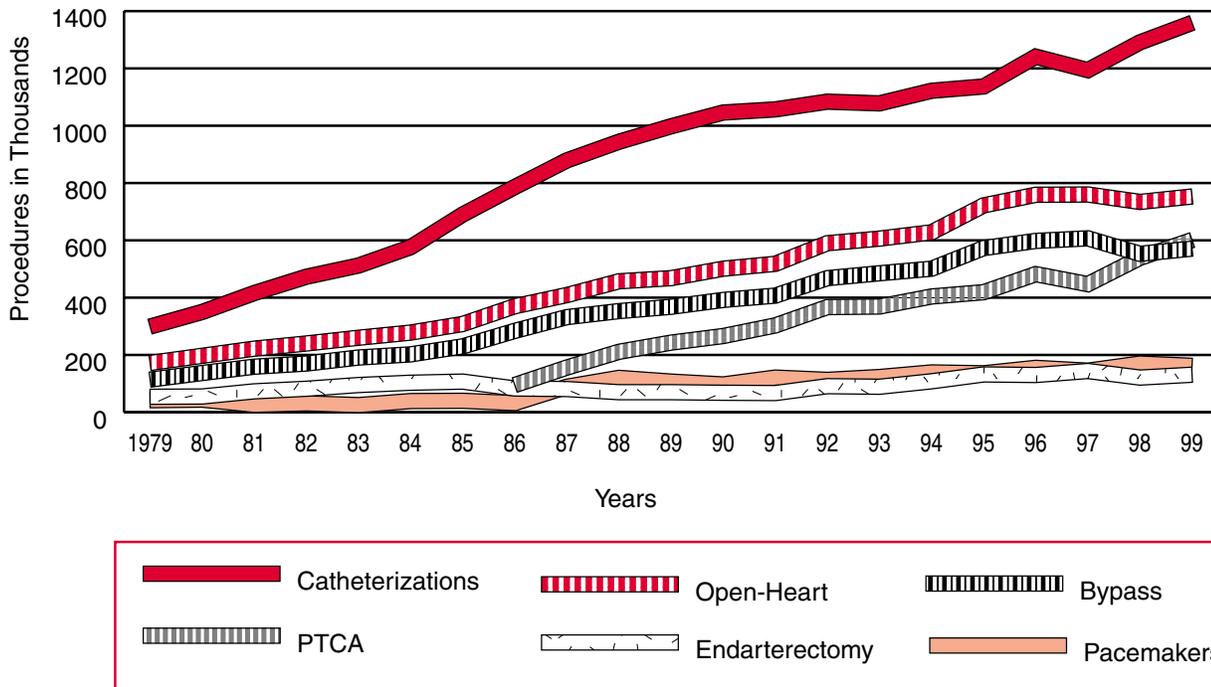
Source: CDC/NCHS and the American Heart Association.

Estimated* Inpatient Cardiovascular Operations, Procedures and Patient Data by Sex, Age and Region
United States: 1999 (in Thousands)

Operations/Procedures/Patients (ICD/9 Code)		Total	Sex		Age				Region#			
			Male	Female	<15	15-44	45-64	65+	Northeast	Midwest	South	West
Angioplasty (36.0)	Procedures	1,069	708	361	—	58	505	504	226	292	361	191
PTCA (36.01, .02, .05) (a)	Procedures	601	398	203	—	29	280	286	118	166	200	109
	Patients	587	388	199	—	32	274	280	120	156	198	112
Stenting (36.06)	Procedures	457	303	154	—	23	221	212	98	125	158	77
Cardiac Revascularization (Bypass)												
(36.1-36.3) (b)	Procedures	571	389	182	—	16	232	322	147	133	178	113
	Patients	355	238	117	—	10	137	207	84	84	113	74
Diagnostic Cardiac Catheterizations												
(37.2) (a)	Procedures	1,359	813	547	12	109	576	663	301	306	540	213
Endarterectomy (38.12)	Procedures	131	67	65	—	—	32	99	26	37	48	21
Implantable Defibrillators (37.94-.99)	Procedures	35	26	10	—	—	9	13	10	10	9	7
Open-Heart Surgery (c)	Procedures	753	478	275	25	39	275	399	203	164	233	142
Pacemakers (37.8) (d)	Procedures	162	77	86	—	—	17	141	41	30	68	23
Valves (35.1, .2, .99)	Procedures	96	47	49	—	7	21	56	26	16	22	16
Total Vascular and Cardiac Surgery and Procedures (35-39)**		**6,133**	**3,498**	**2,634**	**179**	**569**	**2,170**	**3,215**	**1,400**	**1,381**	**2,241**	**1,111**

* Breakdowns are not available for some procedures, so entries for some categories don't add to totals. These data include codes where the estimated number of procedures is fewer than 5,000. Categories of such small numbers are considered unreliable by CDC/NCHS, and in some cases may have been omitted.

** Totals include procedures not shown here.

(a) — Does not include procedures in the outpatient or other nonhospitalized setting; thus, excludes some cardiac catheterizations and PTCAs.

(b) — Some patients have both internal mammary artery grafts and saphenous vein grafts. These numbers represent a combination of code and vessel data. It's impossible from this (mixed) data to determine the average number of vessels per patient.

(c) — Includes valves, bypass and 86,000 "other" open-heart procedures. (Codes 35 [less 35.1-35.2, 35.4, 35.96, 35.99]; 36 [less 36.0-36.1]; 37.1, 37.3-37.5.)

(d) — There are additional insertions, revisions and replacements of pacemaker leads, including those associated with temporary (external) pacemakers.

 # Regions: Northeast — Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont
    Midwest — Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin
    South — Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia
   West — Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming

Source: Health Resources Utilization Branch, CDC/NCHS. Estimates are based on a sample of inpatient records from short-stay hospitals in the United States (National Hospital Discharge Survey).

ECONOMIC COST
of Cardiovascular Diseases

The cost of cardiovascular diseases and stroke in the United States in 2002 is estimated at $329.2 billion. This figure includes health expenditures (direct costs, which include the cost of physicians and other professionals, hospital and nursing home services, the cost of medications, home health care and other medical durables) and lost productivity resulting from morbidity and mortality (indirect costs). By comparison, in 2001 the estimated cost of all cancers was $156.7 billion ($56.4 billion in direct costs and $100.3 billion in indirect costs). In 1999 the estimated cost of HIV infections was $28.9 billion ($13.4 billion direct and $15.5 billion indirect).

Estimated Direct and Indirect Costs (in Billions of Dollars) of Cardiovascular Diseases and Stroke
United States: 2002
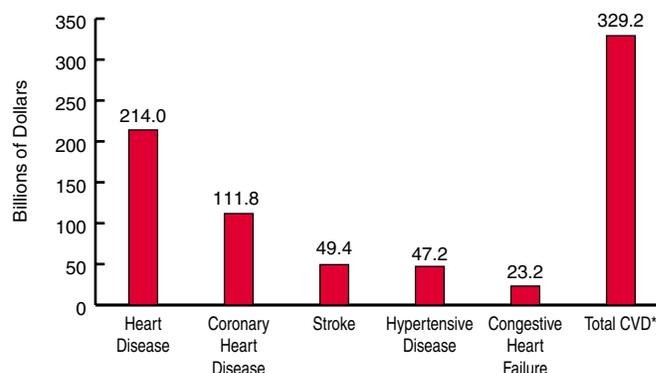
Estimated Direct and Indirect Costs (in Billions of Dollars) of Cardiovascular Diseases and Stroke
United States: 2002

	Heart Disease**	Coronary Heart Disease	Stroke	Hypertensive Disease	Congestive Heart Failure	Total Cardiovascular Disease*
Direct Costs						
Hospital/Nursing Home	$81.0	$41.8	$24.5	$8.6	$15.4	$126.1
Physicians/Other Professionals	15.3	8.6	2.4	8.6	1.6	29.9
Drugs/Other Medical Durables	13.5	6.2	0.8	15.5	2.0	31.8
Home Health Care	5.2	1.6	3.1	1.7	2.4	11.7
Total Expenditures*	**$115.0**	**$58.2**	**$30.8**	**$34.4#**	**$21.4**	**$199.5**
Indirect Costs						
Lost Productivity/Morbidity	19.0	8.4	5.6	6.7	NA	30.9
Lost Productivity/Mortality##	80.0	45.2	13.0	6.1	1.8	98.8
Grand Totals*	**$214.0**	**$111.8**	**$49.4**	**$47.2**	**$23.2**	**$329.2**

* Totals do not add up due to rounding and overlap.

** This category includes coronary heart disease, congestive heart failure, part of hypertensive disease, cardiac dysrhythmias, rheumatic heart disease, cardiomyopathy, pulmonary heart disease, and other or ill-defined "heart" diseases.

\# Tom Hodgson and Liming Cai (*Medical Care*, 2001) estimated that healthcare expenditures attributed to hypertension that could be allocated to cardiovascular complications and other diagnoses totaled $108.8 billion in 1998.

\#\# Lost future earnings of persons who will die in 2002, discounted at 4 percent.

NA indicates not available.

Sources: Hodgson TA, Cohen AJ. Medical care expenditures for selected circulatory diseases: opportunities for reducing national health expenditures. Medical Care, 1999;37:994-1012.

National Health Expenditures Amounts, and Average Annual Percent Change, by Type of Expenditure: Selected Calendar Years 1980-2010 (**www.hcfa.gov**).

Rice DP, Hodgson TA, Kopstein AN. The economic cost of illness: a replication and update. Health Care Financ Rev. 1985;7:61-80.

Historic Income Tables — People," (**www.census.gov**).

Deaths for 282 Selected Causes by 5-Year Age Groups, Race, and Sex, United States, 1998 (**www.cdc.nchs/default/htm**).

Unpublished estimates of the present value of lifetime earnings by age and sex, U.S., 1998, obtained in 2001 from Wendy Max, University of California at San Francisco. All estimates prepared by Thomas Thom, NHLBI.

GLOSSARY

Age-Adjusted Rates — Used mainly to compare the rates of two or more specific communities, population groups, or the nation as a whole, over time. We use a standard population (2000), so that these rates aren't affected by changes or differences in the age composition of the population.

Body Mass Index (BMI) — A mathematical formula to assess body weight relative to height. The measure correlates highly with body fat. Calculated as weight in kilograms divided by the square of the height in meters (kg/m^2).

Centers for Disease Control and Prevention/National Center for Health Statistics (CDC/NCHS) — A division of the U.S. Department of Health and Human Services. The CDC conducts the

- *Behavioral Risk Factor Surveillance System (BRFSS)*, an ongoing study.

The NCHS conducted the

- *National Health and Nutrition Examination Survey I (NHANES I, 1971-74).*
- *National Health and Nutrition Examination Survey II (NHANES II, 1976-80).*
- *National Health and Nutrition Examination Survey III (NHANES III, 1988-94).* Prevalence estimates for coronary heart disease, stroke and congestive heart failure are based on the self-reported questionnaire portion of this study. Exam-based estimates are being developed.

The NCHS also conducts these ongoing studies (among others):

- *National Health Examination Survey (NHES)*
- *National Health Interview Survey (NHIS)*
- *National Hospital Ambulatory Medical Care Survey*
- *National Home and Hospice Care Survey*
- *National Hospital Discharge Survey*

Centers for Medicare and Medicaid Services (CMS), formerly **Health Care Financing Administration (HCFA)** — The federal agency that administers the Medicare, Medicaid and Child Health Insurance Programs, which provide health insurance for more than 74 million Americans.

Comparability Ratio — Provided by the NCHS to allow time-trend analysis from one ICD revision to another. It compensates for the "shifting" of deaths from one causal code number to another. Its application to mortality based on one ICD revision means that mortality is "comparability-modified" so as to be more comparable to mortality coded to the other ICD revision.

Coronary Heart Disease (ICD/10 codes I20-I25) — This category includes acute myocardial infarction (I21-I22); other acute ischemic (coronary) heart disease (I24); angina pectoris (I20); atherosclerotic cardiovascular disease (I25.0); and all other forms of chronic ischemic heart disease (I25.1-I25.9).

Death Rate — The relative frequency with which death occurs within some specified interval of time in a specific population. This overall statistic is known as a **crude rate**. It's restricted because it doesn't reflect a population's composition with respect to such characteristics as age, sex, race or ethnicity. Thus a **specific rate** is a more meaningful and informative death rate. It allows you to look at well-defined subgroups of the total population. Each year the American Heart Association calculates cause-, age-, sex- and race-specific rates as well as crude rates.

Health Care Financing Administration (HCFA) — See Centers for Medicare and Medicaid Services (CMS).

Hospital Discharges — The number of inpatients discharged from short-stay hospitals where some type of disease was the first listed diagnosis. Discharges include people both living and dead.

ICDA Codes — A classification system in standard use in the United States. The "International Classification of Diseases, Adapted" (ICDA) is based on the "International Classification of Diseases" (ICD) published by the World Health Organization. This system is reviewed and revised about every 10 to 20 years to ensure its continued flexibility and feasibility. Currently we are in the tenth revision (ICD/10) with the release of 1999 final mortality data.

Incidence — An estimate of the number of new cases of a disease that develop in a population in a one-year period. For some statistics, new and recurrent attacks or cases are combined.

Morbidity — Incidence and prevalence rates are both measures of morbidity, that is, measures of various effects of disease on a population.

Mortality — The total number of deaths from a given disease in a population during a specific interval of time, usually a year.

National Heart, Lung, and Blood Institute (NHLBI) — An institute in the National Institutes of Health in the U.S. Department of Health and Human Services. The NHLBI conducts such studies as the

- *Framingham Heart Study (1948 to date).*
- *Honolulu Heart Program (1965-97).*
- *Cardiovascular Health Study (CHS) (1988 to date).*
- *Atherosclerotic Risk in Communities (ARIC) study (1985 to date).*
- *Strong Heart Study (1989-92; 1991-98).*

The NHLBI also publishes the reports of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure. JNC VI is the most recent.

Prevalence — An estimate of the total number of cases of a disease existing in a population at a specific point in time. Prevalence is sometimes expressed as a percentage of population.

Total Cardiovascular Disease (ICD/10 codes I00-I99, Q20-Q28) — This category includes rheumatic fever/rheumatic heart disease (I00-I09); hypertensive diseases (I10-I15); ischemic (coronary) heart disease (I20-I25); pulmonary heart disease and diseases of pulmonary circulation (I26-I28); other forms of heart disease (I30-I52); cerebrovascular disease (stroke) (I60-I69); atherosclerosis (I70); other diseases of arteries, arterioles and capillaries (I71-I79); diseases of veins, lymphatics and lymph nodes, not classified elsewhere (I80-I89); and other and unspecified disorders of the circulatory system (I95-I99). Depending upon availability, data for congenital cardiovascular defects (Q20-Q28) are also included.

Total Mention Mortality — The total number of times in a given year that a disease was listed on death certificates as an underlying or contributing cause of death.

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 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 comes along with 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 come by ambulance.

If you can't access the EMS, have someone drive you to the hospital right away. If you're the one having 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.**

American Heart Association®

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

American Stroke Association℠

A Division of American
Heart Association®

For stroke information, call our
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or visit StrokeAssociation.org.
For information on life after
stroke, call and ask for the Stroke
Family Support Network.

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

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