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# Heart Disease and Stroke Statistics



*2007 Update At-a-Glance*

Our guide to current statistics and  
the supplement to our “Heart and Stroke Facts”

# Statistical Fact Sheets

Information for the population groups and risk factors listed below is available at [americanheart.org](http://americanheart.org). Click on “Publications & Resources,” then “Statistics,” then “Statistical Fact Sheets.”

## Populations

- African Americans and Cardiovascular Diseases — Statistics
- American Indians or Alaska Natives and Cardiovascular Diseases — Statistics
- Asian or Pacific Islanders and Cardiovascular Diseases — Statistics
- Baby Boomers and Cardiovascular Diseases — Statistics
- Hispanics or Latinos and Cardiovascular Diseases — Statistics
- International Cardiovascular Disease Statistics [includes death rates by country]**
- Men and Cardiovascular Diseases — Statistics
- Older Americans and Cardiovascular Diseases — Statistics
- Whites and Cardiovascular Diseases — Statistics
- Women and Cardiovascular Diseases — Statistics
- Youth and Cardiovascular Diseases — Statistics

## Risk Factors

- Diabetes Mellitus — Statistics
- High Blood Cholesterol and Other Lipids — Statistics
- High Blood Pressure — Statistics
- Metabolic Syndrome — Statistics
- Overweight and Obesity — Statistics
- Physical Inactivity — Statistics
- Tobacco — Statistics

## Miscellaneous

- Cardiovascular Procedures — Statistics
- Congenital Cardiovascular Defects — Statistics
- Death Rates by State — Statistics
- Hospital Discharges for Cardiovascular Diseases — Statistics
- Leading Causes of Death — Statistics
- Nutrition and Cardiovascular Diseases — Statistics
- Out-of-Hospital Cardiac Deaths by State — Statistics
- Peripheral Arterial Disease — Statistics
- Sudden Deaths From Cardiac Arrest — Statistics
- (Throughout this publication, statistics relating to sudden death from cardiac arrest are highlighted in pink.)
- Understanding and Using American Heart Association Statistics
- Venous Thromboembolism — Statistics

## Check Our Web Sites

For more information on cardiovascular diseases including stroke, see [americanheart.org](http://americanheart.org) and [StrokeAssociation.org](http://StrokeAssociation.org).

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## About These Statistics

All statistics are for the most recent year available. Prevalence, mortality and hospitalizations are computed for 2004 unless otherwise noted.

Do not compare the prevalence or incidence statistics with those in past issues of this publication. It can lead to misinterpretation of time trends.

If you have questions about statistics or any points made in this booklet, please contact the Biostatistics Program Coordinator at the American Heart Association National Center, Nancy.Haase@heart.org, 214-706-1423. Direct all media inquiries to News Media Relations at inquiries@heart.org or 214-706-1173.

We do our utmost to ensure that this update is error-free. A more complete version of this update is available on our Web site, [americanheart.org/statistics](http://americanheart.org/statistics). Click on “Heart Disease and Stroke Statistics — 2007 Update.”

## Acknowledgement

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# At-a-Glance Summary Tables

## Males and Cardiovascular Diseases

Diseases and Risk Factors	Both Sexes	Total Males	White Males	Black Males	Mexican-American Males
<b>Total CVD</b>					
Prevalence 2004**	79.4 M (37.1%)	37.3 M (37.5%)	37.2%	44.6%	31.6%
Mortality 2004**	871.5 K	410.4 K	353.5 K	47.5 K	—
<b>Coronary Heart Disease</b>					
Prevalence 2004**	15.8 M (7.3%)	8.5 M (8.9%)	9.4%	7.1%	5.6%
Prevalence 2004 MI**	7.9 M (3.7%)	4.9 M (5.1%)	5.4%	3.9%	3.1%
Prevalence 2004 AP**	8.9 M (4.1%)	4.3 M (4.4%)	4.8%	3.4%	2.3%
New and recurrent CHD* ##	1.2 M	715.0 K	650.0 K	65.0 K	—
New and recurrent MI**	865.0 K	520.0 K	—	—	—
Incidence AP (stable angina)##	400.0 K	—	—	—	—
Mortality 2004 CHD**	452.3 K	233.3 K	205.5 K	22.9 K	—
Mortality 2004 MI**	157.6 K	83.1 K	73.6 K	7.8 K	—
<b>Stroke</b>					
Prevalence 2004**	5.7 M (2.6%)	2.4 M (2.6%)	2.4%	4.1%	3.1%
New and recurrent strokes**	700.0 K	327.0 K	277.0 K	50.0 K	—
Mortality 2004**	150.1 K	58.7 K	49.3 K	7.6 K	—
<b>High Blood Pressure</b>					
Prevalence 2004**	72.0 M (33.6%)	33.0 M	32.5%	42.6%	28.7%
Mortality 2004**	54.2 K	22.8 K	16.5 K	5.6 K	—
<b>Heart Failure</b>					
Prevalence 2004**	5.2 M (2.5%)	2.6 M (2.8%)	2.8%	2.7%	2.1%
Mortality 2004**	57.7 K	22.5 K	20.0 K	2.1 K	—
<b>Tobacco</b>					
Prevalence 2004+	46.0 M (20.9%)	25.1 M (23.4%)	24.1%	23.9%	18.9%†
<b>Blood Cholesterol</b>					
Prevalence 2004:					
Total cholesterol 200 mg/dL+**	105.2 M (48.4%)	50.1 M (47.8%)	47.9%	44.8%	49.9%
Total cholesterol 240 mg/dL+**	36.6 M (16.8%)	17.0 M (16.2%)	16.1%	14.1%	16.0%
LDL cholesterol 130 mg/dL+**	79.3 M (32.5%)	40.8 M (32.2%)	31.7%	32.4%	39.0%
HDL cholesterol <40 mg/dL**	44.1 M (16.7%)	31.7 M (25.1%)	26.2%	15.5%	27.7%
<b>Physical Activity††</b>					
Prevalence 2004+	30.1%	31.4%	33.4%	29.5%	24.9%†
<b>Overweight and Obesity</b>					
Prevalence 2004:					
Overweight BMI 25.0 or higher**	140.0 M (66.0%)	72.0 M (70.5%)	71.0%	67.0%	74.6%
Obesity BMI 30.0 or higher**	66.0 M (31.4%)	30.0 M (29.5%)	30.2%	30.8%	29.1%
<b>Diabetes Mellitus</b>					
Prevalence 2004:					
Physician-diagnosed diabetes+	15.2 M (7.1%)	7.3 M (7.4%)	6.7%	10.7%	11.0%
Undiagnosed diabetes+	5.0 M (2.4%)	2.9 M (2.9%)	3.2%	1.7%	1.1%
Pre-diabetes+	56.5 M (27.6%)	32.3 M (33.8%)	34.3%	23.1%	37.5%
Incidence—diagnosed diabetes+	1.5 M	—	—	—	—
Mortality 2004**	72.8 K	35.0 K	28.5 K	5.5 K	—

Note: AP = angina pectoris (chest pain); BMI = body mass index; CHD = coronary heart disease includes heart attack, angina pectoris (chest pain) or both; CVD = cardiovascular disease; K = thousand; M = million; MI = myocardial infarction (heart attack); mg/dL = milligrams per deciliter; (—) = data not available; \* = New and recurrent heart attacks and fatal CHD; \*\* = Age 20+; + = Age 18+; ++ = All Ages (mortality data are for whites and blacks); ## = Age 35+; † = Hispanic; †† = Regular leisure-time physical activity.

Sources: See expanded version of the Statistical Update, at [americanheart.org/statistics](http://americanheart.org/statistics). For data on males in other ethnic groups, see other chapters and Statistical Fact Sheets.

# At-a-Glance Summary Tables

## Females and Cardiovascular Diseases

1

Diseases and Risk Factors	Both Sexes	Total Females	White Females	Black Females	Mexican-American Females
<b>Total CVD</b>					
Prevalence 2004**	79.4 M (37.1%)	42.1 M (36.6%)	35.0%	49.0%	34.4%
Mortality 2004**	871.5 K	461.2 K	398.8 K	53.5 K	—
<b>Coronary Heart Disease</b>					
Prevalence 2004**	15.8 M (7.3%)	7.2 M (6.1%)	6.0%	7.8%	5.3%
Prevalence 2004 MI**	7.9 M (3.7%)	3.0 M (2.5%)	2.5%	3.3%	2.1%
Prevalence 2004 AP**	8.9 M (4.1%)	4.6 M (3.9%)	3.9%	4.3%	3.3%
New and recurrent CHD* ##	1.2 M	485.0 K	425.0 K	60.0 K	—
New and recurrent MI##	865.0 K	345.0 K	—	—	—
Incidence AP (stable angina)##	400.0 K	—	—	—	—
Mortality 2004 CHD**	452.3 K	219.1 K	191.5 K	23.6 K	—
Mortality 2004 MI**	157.6 K	74.5 K	64.7 K	8.4 K	—
<b>Stroke</b>					
Prevalence 2004**	5.7 M (2.6%)	3.3 M (2.8%)	2.7%	4.1%	1.9%
New and recurrent strokes**	700.0 K	373.0 K	312.0 K	61.0 K	—
Mortality 2004**	150.1 K	91.5 K	78.8 K	10.4 K	—
<b>High Blood Pressure</b>					
Prevalence 2004**	72.0 M (33.6%)	39.0 M	31.9%	46.6%	31.4%
Mortality 2004**	54.2 K	31.4 K	24.1 K	6.6 K	—
<b>Heart Failure</b>					
Prevalence 2004**	5.2 M (2.5%)	2.6 M (2.2%)	2.1%	3.3%	1.9%
Mortality 2004**	57.7 K	35.2 K	31.8 K	3.0 K	—
<b>Tobacco</b>					
Prevalence 2004+	46.0 M (20.9%)	20.9 M (18.5%)	20.4%	17.2%	10.9%†
<b>Blood Cholesterol</b>					
Prevalence 2004:					
Total cholesterol 200 mg/dL+**	105.2 M (48.4%)	55.2 M (48.6%)	49.7%	42.1%	50.0%
Total cholesterol 240 mg/dL+**	36.6 M (16.8%)	19.7 M (17.1%)	18.2%	12.5%	14.2%
LDL cholesterol 130 mg/dL+**	79.3 M (32.5%)	38.6 M (32.4%)	33.8%	29.8%	30.7%
HDL cholesterol <40 mg/dL**	44.1 M (16.7%)	12.3 M (9.1%)	8.8%	6.9%	13.0%
<b>Physical Activity††</b>					
Prevalence 2004+	30.1%	29.0%	31.8%	19.6%	21.8%†
<b>Overweight and Obesity</b>					
Prevalence 2004:					
Overweight BMI 25.0 or higher**	140.0 M (66.0%)	68.0 M (61.6%)	57.6%	79.6%	73.0%
Obesity BMI 30.0 or higher**	66.0 M (31.4%)	36.0 M (33.2%)	30.7%	51.1%	39.4%
<b>Diabetes Mellitus</b>					
Prevalence 2004:					
Physician-diagnosed diabetes+	15.2 M (7.1%)	7.9 M (6.9%)	5.6%	13.2%	10.9%
Undiagnosed diabetes+	5.0 M (2.4%)	2.1 M (1.9%)	1.7%	2.3%	3.1%
Pre-diabetes+	56.5 M (27.6%)	24.2 M (21.7%)	21.6%	20.5%	22.6%
Incidence—diagnosed diabetes+	1.5 M	—	—	—	—
Mortality 2004**	72.8 K	37.8 K	29.4 K	7.2 K	—

Note: AP = angina pectoris (chest pain); BMI = body mass index; CHD = coronary heart disease includes heart attack, angina pectoris (chest pain) or both; CVD = cardiovascular disease; K = thousand; M = million; MI = myocardial infarction (heart attack); mg/dL = milligrams per deciliter; (—) = data not available; \* = New and recurrent heart attacks and fatal CHD; \*\* = Age 20+; + = Age 18+; \*\* = All Ages (mortality data are for whites and blacks); ## = Age 35+; † = Hispanic; †† = Regular leisure-time physical activity.

Sources: See expanded version of the Statistical Update, at [americanheart.org/statistics](http://americanheart.org/statistics). For data on females in other ethnic groups, see other chapters and Statistical Fact Sheets.

# At-a-Glance Summary Tables

## Ethnic Groups and Cardiovascular Diseases

Diseases and Risk Factors	Both Sexes	Whites		Blacks		Mexican Americans		Hispanics/Latinos	
		Males	Females	Males	Females	Males	Females	Males	Females
<b>Total CVD</b>									
Prevalence 2004**	79.4 M (37.1%)	37.2%	35.0%	44.6%	49.0%	31.6%	34.4%	—	—
Mortality 2004**	871.5 K	353.5 K	398.8 K	47.5 K	53.5 K	—	—	—	—
<b>Coronary Heart Disease</b>									
Prevalence 2004 CHD**	15.8 M (7.3%)	9.4%	6.0%	7.1%	7.8%	5.6%	5.3%	—	6.0%
Prevalence 2004 MI**	7.9 M (3.7%)	5.4%	2.5%	3.9%	3.3%	3.1%	2.1%	—	—
Prevalence 2004 AP**	8.9 M (4.1%)	4.8%	3.9%	3.4%	4.3%	2.3%	3.3%	—	—
New and recurrent CHD* ##	1.2 M	650.0 K	425.0 K	65.0 K	60.0 K	—	—	—	—
New and recurrent MI	865.0 K	—	—	—	—	—	—	—	—
Mortality 2004 CHD**	452.3 K	205.5 K	191.5 K	22.9 K	23.6 K	—	—	—	—
Mortality 2004 MI**	157.6 K	73.6 K	64.7 K	7.8 K	8.4 K	—	—	—	—
<b>Stroke</b>									
Prevalence 2004**	5.7 M (2.6%)	2.4%	2.7%	4.1%	4.1%	3.1%	1.9%	—	2.8%+
New and recurrent strokes**	700.0 K	277.0 K	312.0 K	50.0 K	61.0 K	—	—	—	—
Mortality 2004**	150.1 K	49.3 K	78.8 K	7.6 K	10.4 K	—	—	—	—
<b>High Blood Pressure</b>									
Prevalence 2004**	72.0 M (33.6%)	32.5%	31.9%	42.6%	46.6%	28.7%	31.4%	—	19.0%
Mortality 2004**	54.2 K	16.5 K	24.1 K	5.6 K	6.6 K	—	—	—	—
<b>Heart Failure</b>									
Prevalence 2004**	5.2 M (2.5%)	2.8%	2.1%	2.7%	3.3%	2.1%	1.9%	—	—
Mortality 2004**	57.7 K	20.0 K	31.8 K	2.1 K	3.0 K	—	—	—	—
<b>Tobacco</b>									
Prevalence 2004*	46.0 M (20.9%)	24.1%	20.4%	23.9%	17.2%	—	—	18.9%	10.9%
<b>Blood Cholesterol</b>									
Prevalence 2004:									
Total cholesterol 200 mg/dL+**	105.2 M (48.4%)	47.9%	49.7%	44.8%	42.1%	49.9%	50.0%	—	—
Total cholesterol 240 mg/dL+**	36.6 M (16.8%)	16.1%	18.2%	14.1%	12.5%	16.0%	14.2%	—	25.6%†
LDL cholesterol 130 mg/dL+**	79.3 M (32.5%)	31.7%	33.8%	32.4%	29.8%	39.0%	30.7%	—	—
HDL cholesterol <40 mg/dL**	44.1 M (16.7%)	26.2%	8.8%	15.5%	6.9%	27.7%	13.0%	—	—
<b>Physical Activity††</b>									
Prevalence 2004*	30.1%	33.4%	31.8%	29.5%	19.6%	—	—	24.9%	21.8%
<b>Overweight and Obesity</b>									
Prevalence 2004:									
Overweight BMI 25.0 or higher**	140.0 M (66.0%)	71.0%	57.6%	67.0%	79.6%	74.6%	73.0%	—	38.9%+
Obesity BMI 30.0 or higher**	66.0 M (31.4%)	30.2%	30.7%	30.8%	51.1%	29.1%	39.4%	—	24.7%+
<b>Diabetes Mellitus</b>									
Prevalence 2004:									
Physician-diagnosed diabetes+	15.2 M (7.1%)	6.7%	5.6%	10.7%	13.2%	11.0%	10.9%	—	10.4%
Undiagnosed diabetes+	5.0 M (2.4%)	3.2%	1.7%	1.7%	2.3%	1.1%	3.1%	—	—
Pre-diabetes+	56.5 M (27.6%)	34.3%	21.6%	23.1%	20.5%	37.5%	22.6%	—	—
Incidence—diagnosed diabetes+	1.5 M	—	—	—	—	—	—	—	—
Mortality 2004**	72.8 K	28.5 K	29.4 K	5.5 K	7.2 K	—	—	—	—

Note: AP = angina pectoris (chest pain); BMI = body mass index; CHD = coronary heart disease; includes heart attack, angina pectoris (chest pain) or both; CVD = cardiovascular disease; K = thousand; M = million; MI = myocardial infarction (heart attack); mg/dL = milligrams per deciliter; (—) = data not available; \* = New and recurrent heart attacks and fatal CHD; \*\* = Age 20+; + = Age 18+; ++ = All Ages (mortality data are for whites and blacks); ## = Age 35+; † = BRFSS (1997). MMWR, Vol. 49, No. SS-2, March 24, 2000; †† = Regular leisure-time physical activity.

Sources: See expanded version of the Statistical Update, at [americanheart.org/statistics](http://americanheart.org/statistics). For data on other ethnic groups, see other chapters and Statistical Fact Sheets.

# At-a-Glance Summary Tables

## Children, Youth and Cardiovascular Diseases

1

Diseases and Risk Factors	Both Sexes	Total Males	Total Females	Whites		Blacks		Mexican Americans	
				Males	Females	Males	Females	Males	Females
<b>Congenital CV Defects</b>									
Mortality 2003 <sup>++</sup>	4.0 K	2.1 K	1.9 K	1.4 K	1.2 K	0.3 K	0.3 K	—	—
Mortality 2003 (< age 15)	2.1 K	1.2 K	0.9 K	0.6 K	0.5 K	0.2 K	0.2 K	—	—
<b>Tobacco</b>									
Prevalence ages 12-17:									
Current cigarette use 2004	11.9	11.3%	12.5%	13.3%	15.7%	6.5%	5.5%	8.8%*	9.4%*
High school students grades 9-12:									
Current cigarette smoking 2005	23.0	22.9%	23.0%	24.9%	27.0%	14.0%	11.9%	24.8%*	19.2%*
Current cigar smoking 2005	14.0	19.2%	8.7%	21.0%	8.6%	12.3%	8.3%	20.0%*	9.1%*
Smokeless tobacco use 2005	8.0	13.6%	2.2%	17.6%	2.7%	3.0%	0.4%	8.6%*	1.5%*
<b>Blood Cholesterol</b>									
Ages 4-19:									
Mean total cholesterol mg/dL	165	163	167	162	166	168	171	163	165
Ages 4-19:									
Mean HDL cholesterol mg/dL	—	—	—	48	50	55	56	51	52
Ages 12-19:									
Mean LDL cholesterol mg/dL	—	—	—	91	100	99	102	93	92
<b>Physical Activity<sup>†</sup></b>									
Prevalence 2003 grades 9-12: <sup>#</sup>									
At least 60 minutes of PA on 5 or more of last 7 days	35.8%	43.8%	27.8%	46.9%	30.2%	38.2%	21.3%	39.0%*	26.5%*
At least 20 minutes of vigorous PA on 3 or more of last 7 days and/or at least 20 minutes of moderate PA on 5 or more of last 7 days	68.7%	75.8%	61.5%	77.0%	63.3%	71.7%	53.1%	76.0%*	62.6%*
<b>Overweight</b>									
Prevalence 2003:									
Children ages 2-5 <sup>††</sup>	14%	—	—	11.5%	13.0%	19.2%			
Children ages 6-11	4.2 M (17.5%)	2.3 M (18.7%)	1.9 M (16.3%)	16.9%	15.6%	17.2%	24.8%	25.6%	16.6%
Adolescents ages 12-19	5.7 M (17.0%)	3.1 M (17.9%)	2.6 M (16.0%)	17.9%	14.6%	17.7%	23.8%	20.0%	17.1%
Students grades 9-12 <sup>#</sup>	13.1%	16.0%	10.0%	15.2%	8.2%	15.9%	16.1%	21.3%*	12.1%*

Note: K = thousand; M = million; mg/dL = milligrams per deciliter; overweight in children is body mass index (BMI) 95th percentile of the CDC 2000 growth chart; (—) = data not available; \* = Hispanic; † = Regular leisure-time physical activity; †† = 2003-04; ++ = Mortality data for whites and blacks; # = CDC. Youth Risk Behavior Surveillance, U.S., 2005. Surveillance Summaries, June 9, 2006. MMWR 2006;55(SS-5).

Sources: See expanded version of the Statistical Update, at [americanheart.org/statistics](http://americanheart.org/statistics). For more data on congenital defects, see Chapter 6, and our Statistical Fact Sheet, Congenital Cardiovascular Defects.

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

## Prevalence

An estimated 79,400,000 American adults (one in three) have one or more types of cardiovascular disease (CVD), of whom 37,500,000 are estimated to be age 65 or older. (Total CVD includes diseases in the bullet points below except for congenital CVD.) Except as noted, the estimates were extrapolated to the U.S. population in 2004 from NHANES 1999–2004. Due to overlap, it is not possible to add these conditions to arrive at a total.

- High blood pressure (HBP)—72,000,000. (Defined as systolic pressure of 140 mm Hg or greater and/or diastolic pressure of 90 mm Hg or greater, taking antihypertensive medication or being told at least twice by a physician or other health professional that you have high blood pressure.)
- Coronary heart disease (CHD)—15,800,000.
  - Myocardial infarction (MI, or heart attack)—7,900,000.
  - Angina pectoris (AP, or chest pain)—8,900,000.
- Heart failure (HF)—5,200,000.
- Stroke—5,600,000.
- Congenital cardiovascular defects—650,000—1,300,000.
- One in three adult men and women has some form of CVD. (*NHANES 1999–2004, NCHS and NHLBI*)
- The following prevalence estimates are for people age 18 and older: (*NCHS NHIS; Vital Health Stat 10.2006[228]*)
  - Among whites only, 11.9 percent have heart disease, 6.6 percent have CHD, 21.2 percent have hypertension and 2.5 percent have had a stroke.
  - Among blacks or African Americans only, 9.6 percent have heart disease, 5.2 percent have CHD, 29.2 percent have hypertension and 3.2 percent have had a stroke.
  - Among Hispanics or Latinos, 9.2 percent have heart disease, 6.0 percent have CHD, 19.6 percent have hypertension and 2.8 percent have had a stroke.

[ Nearly 80 million  
U.S. adults have CVD. ]

- Among Asians, 6.7 percent have heart disease, 4.2 percent have CHD, 16.9 percent have hypertension and 2.4 percent have had a stroke.
- Among Native Hawaiians or other Pacific Islanders, 13.8 percent have heart disease, 13.8 percent have CHD, 20.7 percent have hypertension and 8.1 percent have had a stroke.
- Among American Indians or Alaska Natives, 11.6 percent have heart disease, 7.6 percent have CHD, 25.4 percent have hypertension and 5.1 percent have had a stroke.

## Incidence

- Based on the NHLBI's Framingham Heart Study (FHS) in its 44-year follow-up of participants and the 20-year follow-up of their offspring... (*Hurst W. The Heart, Arteries and Veins. 10th ed. New York, NY: McGraw-Hill; 2002*)
  - The average annual rates of first major cardiovascular events rise from seven per 1,000 men at ages 35–44 to 68 per 1,000 at ages 85–94. For women, comparable rates occur 10 years later in life. The gap narrows with advancing age.
  - Before age 75, a higher proportion of CVD events due to CHD occur in men than in women, and a higher proportion of events due to congestive heart failure (CHF) occur in women than in men.
- Data from the FHS indicate that the lifetime risk for CVD is two in three for men and more than one in two for women at age 40. (*personal communication, Donald Lloyd-Jones, MD*)

## Mortality

- Mortality data show that CVD (I00-I99) as the underlying cause of death accounted for 36.3 percent of all 2,398,000 deaths in 2004, or one of every 2.8 deaths in the United States. CVD “total mention” mortality (1,408,000 deaths) accounted for about 58 percent of all deaths in 2002. (*Minino AM, Heron MP, Smith BL. Preliminary Data for 2004 National Vital Statistics Reports; Vol 54. No 19. Hyattsville, MD: National Center for Health Statistics, 2006.*)



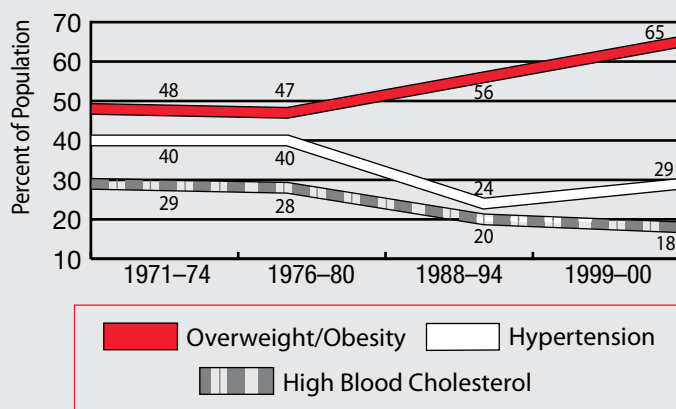
- In every year since 1900, except 1918, CVD accounted for more deaths than any other single cause or group of causes of death in the United States.
- Nearly 2,400 Americans die of CVD each day, an average of one death every 36 seconds. CVD claims more lives each year than cancer, chronic lower respiratory diseases, accidents and diabetes mellitus combined. (Minino AM, Heron MP, Smith BL. Preliminary Data for 2004 National Vital Statistics Reports; Vol 54. No 19. Hyattsville, MD: National Center for Health Statistics, 2006.)
- The 2004 overall death rate from CVD (I00-I99) was 288.6. The rates were 335.7 for white males and 448.9 for black males; 239.3 for white females and 331.6 for black females. From 1994–2004, death rates from CVD (ICD/10 I00-I99) declined 25 percent. In the same 10-year period, actual CVD deaths declined 8 percent. (Minino AM, Heron MP, Smith BL. Preliminary Data for 2004 National Vital Statistics Reports; Vol 54. No 19. Hyattsville, MD: National Center for Health Statistics, 2006.)
- Other causes of death in 2004—cancer, 550,270; accidents, 108,694; Alzheimer’s disease, 65,829; HIV (AIDS), 12,995. (Minino AM, Heron MP, Smith BL. Preliminary Data for 2004 National Vital Statistics Reports; Vol 54. No 19. Hyattsville, MD: National Center for Health Statistics, 2006.)
- The 2004 CVD death rates were 341.8 for males and 246.3 for females. Cancer (malignant neoplasms) death rates were 226.4 for males and 156.2 for females.
- Breast cancer claimed the lives of 40,539 females in 2004; lung cancer claimed 67,838 female lives. Death rates for females were 24.2 for breast cancer and 40.5 for lung cancer. One in 30 female deaths are from breast cancer, while one in six is from CHD. One in 4.6 women die of cancer while one in 2.6 die of CVD. Based on 2004 mortality, CVD caused about a death a minute among females—more than 460,000 female lives in 2004. That’s more female lives than were claimed by cancer, chronic lower respiratory diseases, Alzheimer’s, diabetes and accidents combined. (NCHS. Unpublished mortality tables for 2004. Personal communication with NHLBI, 6/01/06.)
- Over 147,000 Americans killed by CVD in 2004 were under age 65. In 2004, 32 percent of deaths from CVD occurred prematurely (i.e., before age 75, which is close to the average life expectancy). (Minino AM, Heron MP, Smith BL. Preliminary Data for 2004 National Vital Statistics Reports; Vol 54. No 19. Hyattsville, MD: National Center for Health Statistics, 2006.)

- According to the NCHS, if all forms of major CVD were eliminated, life expectancy would rise by almost seven years. If all forms of cancer were eliminated, the gain would be three years. According to the same study, the probability at birth of eventually dying from major CVD (I00-I78) 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, Volume 1, No. 4. Eliminating Certain Causes of Death, 1989-91. NCHS, September 1999.)

## Out-of-Hospital Cardiac Arrest

- According to NCHS Data Warehouse mortality data, 325,000 CHD deaths occur out-of-hospital or in hospital emergency departments annually (2003) (ICD-10 codes I20-I25). (Vital Statistics of the U.S., Data Warehouse, NCHS. <http://www.cdc.gov/nchs/datawh.htm>.)
- About 60 percent of unexpected cardiac deaths are treated by Emergency Medical Services (EMS). (J Am Coll Cardiol. 2004;44:1268-1275.)
- On average, 27.4 percent of out-of-hospital cardiac arrests receive bystander cardiopulmonary resuscitation (CPR). (Ann Emerg Med. 1999;34:517-525.)
- The incidence of lay responder defibrillation is low, 2.05 percent in 2002, but increasing over time. (Circulation. 2004;109:1859-1863.)
- Unexpected death in the pediatric patient is usually due to trauma, sudden infant death syndrome, respiratory causes or submersion. (Pediatrics. 2004;114:157-164.)
- The incidence of in-hospital cardiac arrest is unknown.

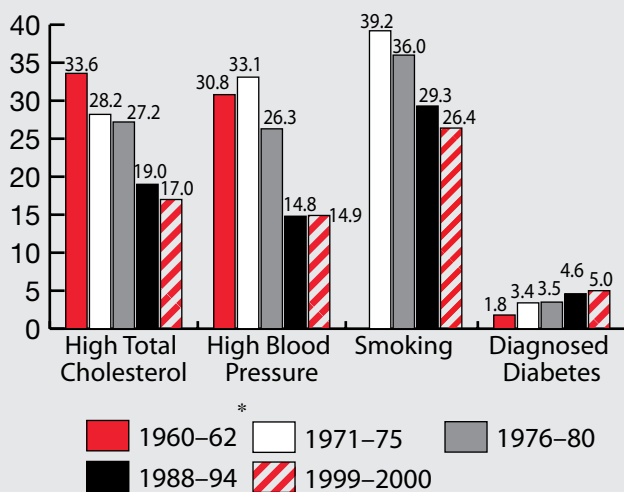
**Trends in the Age-adjusted Prevalence of Health Conditions Among U.S. Adults Ages 20–74**  
NHANES: 1971–74 to 1999–2000



Source: Briefel RR, et al. Secular trends in dietary intake in the United States. Ann Rev Nutr 2004;24:401-31.

## Trends in Cardiovascular Risk Factors in the U.S. Population, Ages 20–74

NHES: 1960–62. NHANES: 1971–75 to 1999–2000



Source: Gregg EW, et al. Secular trends in cardiovascular disease risk factors according to body mass index in US adults. *JAMA* 2005;293:1868-74. In this study group, high total cholesterol was defined as greater than or equal to 240 mg/dL; high blood pressure was defined as greater than or equal to 140/90 mm Hg.

\* Smoking data not available for 1960–62.

## Risk Factors/ Impact of Healthy Lifestyle

- In respondents ages 18–74, data from the 2000 BRFSS (CDC) showed the prevalence of “healthy lifestyle characteristics” (HLC) was as follows: nonsmoking, 76.0 percent; healthy weight, 40.1 percent; five fruits and vegetables per day, 23.3 percent; and regular physical activity, 22.2 percent. The overall prevalence of the healthy lifestyle indicator (i.e., having all four HLCs) was only 3 percent, with little variation among subgroups. (*Arch Intern Med.* 2005;165:854-857.)
- A study of 366,000 men and women from the MRFIT screenee and Chicago cohorts defined low risk status as follows: serum cholesterol level <200 mg/dL, untreated blood pressure  $\leq 120/\leq 80$  mm Hg, no current smoking, no diabetes and no major electrocardiographic abnormalities. Compared to those who did not have low risk status, those with low risk status had 73–85 percent lower risk for CVD mortality, 40–60 percent lower total mortality, and 6–10 years greater life expectancy. (*JAMA.* 1999;282:2012-2018.)

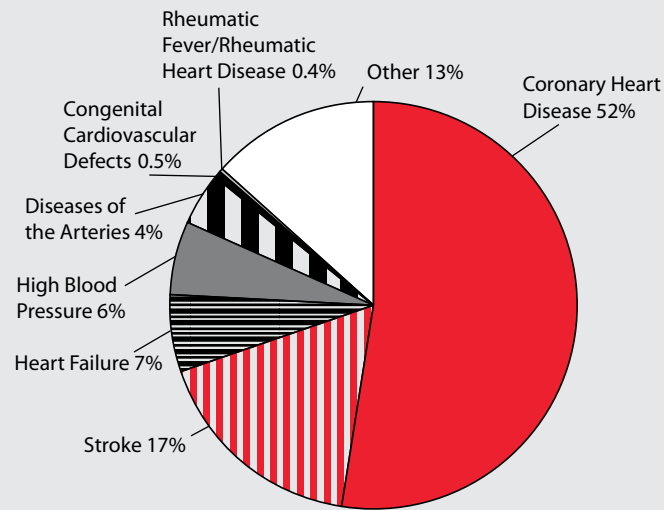
- Among individuals ages 70–90, eating a Mediterranean-style diet and greater physical activity are associated with 65–73 percent lower rates of all-cause mortality, as well as mortality due to CHD, CVD and cancer. (*JAMA.* 2004;292:1433-1439.)
- The NHANES II Mortality Follow-UP Study indicates that the risk for fatal CHD was 51 percent lower for men and 71 percent lower for women with none of three major risk factors (hypertension, current smoking and elevated total cholesterol  $\geq 240$  mg/dL) compared to those with one or more risk factors. (*Am J Prev Med.* 2005;29:68-74.)

## Hospital Discharges/ Ambulatory Care Visits/ Nursing Home Visits

- From 1979–2004, the number of inpatient discharges from short-stay hospitals with CVD as the first listed diagnosis increased 30 percent to 6,363,000 discharges. In 2004, CVD ranked highest among all disease categories in hospital discharges. (*NCHS, NHDS.*)
- In 2004, there were 72,648,000 physician office visits with a primary diagnosis of CVD. (*Hing E, Cherry DK, Woodwell DA. National Ambulatory Medical Care Survey: 2004 Summary. Advance data from vital and health statistics; no. 374. 2006.*)
- In 2004, there were 4,164,000 visits to emergency departments with a primary diagnosis of CVD. (*McCaig LF, Nawar EN. National Hospital Ambulatory Medical Care Survey: 2004 Emergency Department Summary. Advance data from vital and health statistics; no. 372. 2006.*)
- In 1999, 23 percent of nursing home residents age 65 or older had a primary diagnosis of CVD at admission. This was the highest disease category for these residents. (*Jones A. The National Nursing Home Survey: 1999 Summary. National Center for Health Statistics. Vital Health Stat 13.2002[152].*)
- In 2004, there were 6,369,000 outpatient department visits with a primary diagnosis of CVD. (*Middleton KR, Hing E, National Hospital Ambulatory Medical Care Survey: 2004 Outpatient Department Summary. Advance data from vital and health statistics; no. 373. 2006.*)

### Percentage Breakdown of Deaths From Cardiovascular Diseases

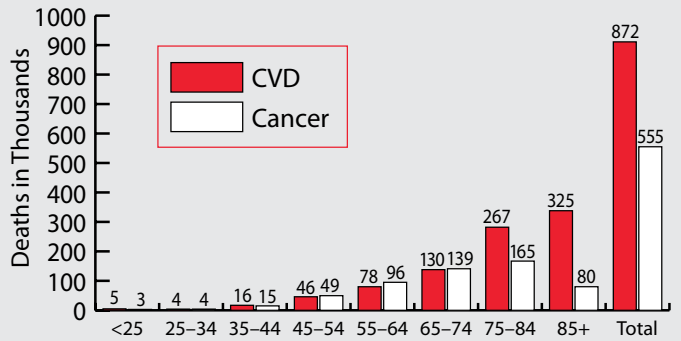
United States: 2004



Source: CDC/NCHS.

### Cardiovascular Disease Deaths vs. Cancer Deaths by Age

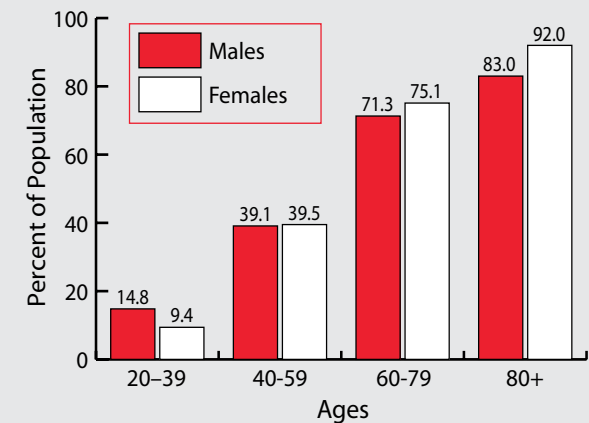
United States: 2004



Source: NCHS and NHLBI.

### Prevalence of Cardiovascular Diseases in Adults Age 20 and Older by Age and Sex

NHANES: 1999–2004



Source: NCHS and NHLBI. These data include CHD, HF, stroke and hypertension

### Cost

- The estimated direct and indirect cost of CVD in the United States for 2007 is \$431.8 billion.

### Operations and Procedures

- In 2004, an estimated 6,363,000 inpatient cardiovascular operations and procedures were performed in the United States; 3.2 million were performed on males and 3.1 million were performed on females. (DeFrances CJ, Podgornik MN. 2004 National Hospital Discharge Survey. Advance data from vital and health statistics; no. 371. 2006; and 2004 unpublished data from NCHS and NHLBI.)

For more statistics on cardiovascular diseases, please visit our Web site at [www.americanheart.org/statistics](http://www.americanheart.org/statistics).

# Coronary Heart Disease, Acute Coronary Syndrome and Angina Pectoris

## Coronary Heart Disease (CHD)

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

### Prevalence

- Among adults age 20 and older, the prevalence of coronary heart disease (CHD) in 2004 was 15,800,000 (8,500,000 males, 7,200,000 females).

### Incidence

- This year an estimated 700,000 Americans will have a new coronary attack and about 500,000 will have a recurrent attack. It is estimated that an additional 175,000 silent first heart attacks occur each year. (*NHLBI: Based on unpublished data from the ARIC Study, and the CHS*)
- The estimated annual incidence of myocardial infarction (MI) is 565,000 new attacks and 300,000 recurrent attacks annually. (*Hurst W. The Heart, Arteries and Veins. 10th ed. New York, NY: McGraw-Hill; 2002.*)
- The average age of a person having a first heart attack is 65.8 for men and 70.4 for women. (*National Heart, Lung, and Blood Institute. Unpublished data from ARIC surveillance and CHS, extrapolated to the U.S. population.*)
- Based on the NHLBI's FHS, in its 44-year follow-up of participants, and the 20-year follow-up of their offspring. (*National Heart, Lung, and Blood Institute. Unpublished data from ARIC surveillance and CHS, extrapolated to the U.S. population.*)
  - CHD comprises more than half of all cardiovascular 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. (*Lancet. 1999;353:89-92.*)
  - 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.
- The annual age-adjusted rates per 1,000 population of first MI in an ARIC Surveillance was 4.2 in black men, 3.9 in white men, 2.8 in black

women and 1.7 in white women. (*NHLBI Incidence & Prevalence: 2006 Chart Book on Cardiovascular and Lung Diseases.*) Combining the rates for possible and definite CHD shows that 17–25 of every 100 American Indian men ages 45–74 have some evidence of heart disease. (*Strong Heart Study Data Book. Washington, DC: NIH, NHLBI; 2001.*)

- CHD rates in women after menopause are two to three times those of women the same age before menopause. (*Ann Intern Med. 1976;85:447-452.*)

### Mortality

- CHD caused one of every five deaths in the United States in 2004. CHD mortality in 2004—452,327. MI mortality in 2004—157,559. (*Vital Statistics of the United States, NCHS*)
- CHD is the **single** largest killer of American males and females. About every 26 seconds, an American will suffer a coronary event, and about every minute someone will die from one. About 38 percent of the people who experience a coronary attack in a given year will die from it. (*AHA computation.*)
- An analysis of data from the FHS showed that overall CHD death rates decreased by 59 percent from 1950–99. Nonsudden CHD death decreased by 64 percent, and sudden cardiac death fell by 49 percent. These trends were seen in men and women, in subjects with and without a prior history of CHD, and in smokers and nonsmokers. (*Circulation. 2004;110:522-527.*)
- From 1994–2004, the death rate from CHD declined 33 percent but the actual number of deaths declined only 18 percent. In 2004, the overall CHD death rate was 150.5 per 100,000 population. The death rates were 194.4 for white males and 222.2 for black males; for white females, the rate was 115.4, and for black females it was 148.6. (*NCHS and NHLBI*) The 2003 age-adjusted death rates for CHD were 130.0 for Hispanics or Latinos, 114.1 for American Indians or Alaska



Natives, and 92.8 for Asians or Pacific Islanders. (NCHS. Health, United States, 2005. With chartbook on trends in the health of Americans. Hyattsville, MD: National Center for Health Statistics, 2005.)

- About 83 percent of people who die of CHD are age 65 or older. (NCHS, AHA computation.)
- The estimated average number of years of life lost due to a heart attack is 15. (NHLBI tabulation of mortality for 2003 for ischemic heart disease in Table GMWK210F in the NCHS Data Warehouse, July 2006.)
- Based on data from the FHS of the NHLBI: (Hurst W. The Heart, Arteries and Veins. 10th ed. New York, NY: McGraw-Hill; 2002)

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

- 50 percent of men and 64 percent of women who died suddenly of CHD had no previous symptoms of this disease. Between 70 percent and 89 percent of sudden cardiac deaths occur in men, and the annual incidence is three to four times higher in men than in women. However, this disparity decreases with advancing age.
- People who've had a heart attack have a sudden death rate that's four to six times that of the general population.
- Sudden cardiac death accounts for 19 percent of sudden deaths in children ages 1–13 and 30 percent between 14 and 21 years of age. The overall incidence is low, 600 cases per year.

### Risk Factors

- A study of men and women in three prospective cohort studies found that about 90 percent of CHD patients have prior exposure to at least one of the following major risk factors: high total blood cholesterol levels, or current medication with cholesterol-lowering drugs; hypertension, or current medication with blood pressure-lowering drugs; current cigarette use; and clinical report of diabetes. (JAMA. 2003;290:891-897.)
- According to a case-control study of 52 countries (INTERHEART), nine easily measured and potentially modifiable risk factors account for over 90 percent of the risk of an initial acute MI. The effect of these risk factors is consistent in men and women across different geographic regions and by ethnic group, making the study applicable worldwide. These nine risk factors include cigarette smoking, abnormal blood lipid levels, hypertension, diabetes, abdominal obesity, a lack

of physical activity, low daily fruit and vegetable consumption, alcohol overconsumption and psychosocial index. (Lancet. 2004;364:937-952.)

- A study of non-Hispanic white persons ages 35–74 in the FHS and the NHANES III studies showed that 26 percent of men and 41 percent of women had at least one borderline CHD risk factor. It is estimated that more than 90 percent of CHD events will occur in people with at least one elevated risk factor and approximately 8 percent will occur in people with only borderline levels of multiple risk factors. (Ann Intern Med. 2005;142:393-402.)

### Awareness of Warning Signs and Risk Factors for Cardiovascular Disease

- A study of over 1,000 women showed awareness of CVD as the leading cause of death nearly doubled from 1997–2003 (55 percent vs. 30 percent); was greater for whites than blacks or Hispanics (62 percent vs. 38 percent and 34 percent respectively), and that this awareness was independently correlated with increased physical activity and weight loss. Fewer than half of respondents were aware of healthy levels of risk factors. (Circulation. 2006;113:525-34.)
- A 2004 national study of physician awareness and adherence to cardiovascular disease (CVD) prevention guidelines showed that fewer than one in five physicians knew that more women than men die each year from CVD. (Circulation. 2005;111:499-510.)
- Recent data indicate that certain Hispanic subpopulations (Mexican Americans, Puerto-Rican Americans, Cuban Americans, and other Hispanic Americans) are characterized by low levels of hypertension awareness, treatment and control. CDC analysis of death certificate data from 1995 and 2002 indicated that Puerto-Rican Americans had consistently higher hypertension-related mortality rates than all other Hispanic subpopulations and non-Hispanic whites. (MMWR Morb Mortal Wkly Rep. 2006;55:177-80.)

### Aftermath

- Depending on their gender 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 (AP), heart failure (HF) and stroke—for both men and women—is substantial (*FHS, NHLBI*). (*Hurst W. The Heart, Arteries and Veins. 10th ed. New York, NY: McGraw-Hill; 2002.*)

- Based on pooled data from the FHS, ARIC and CHS studies of the NHLBI, within one year following a first MI:
  - at age 40 and older, 18 percent of men and 23 percent of women will die.
  - at ages 40–69, 8 percent of white men, 12 percent of white women, 14 percent of black men and 11 percent of black women will die.
  - at age 70 and older, 27 percent of white men, 32 percent of white women, 26 percent of black men and 28 percent of black women will die.
  - 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.
- Within five years following a first MI:
  - at age 40 and older, 33 percent of men and 43 percent of women will die.
  - at ages 40–69, 15 percent of white men, 22 percent of white women, 27 percent of black men and 32 percent of black women will die.
  - at age 70 and older, 50 percent of white men, 56 percent of white women, 56 percent of black men and 62 percent of black women will die.

## Hospital Discharges/ Ambulatory Care Visits

- From 1979–2004, the number of inpatient discharges from short-stay hospitals with CHD as the first listed diagnosis increased 14 percent to 1,981,000. (*AHA computation.*)

## Cost

- The estimated direct and indirect cost of CHD in the United States for 2007 is \$151.6 billion.

## Operations and Procedures (Hospital Inpatients)

- In 2004, an estimated 1,285,000 inpatient angioplasty procedures, 427,000 inpatient bypass procedures, 1,471,000 inpatient diagnostic cardiac catheterizations, 68,000 inpatient implantable defibrillators, and 170,000 inpatient pacemaker procedures, were performed in the United States. (*NHDS*)

## Acute Coronary Syndrome (ACS)

(ICD/9 codes 410, 411)

The term “acute coronary syndrome” (ACS) is increasingly used to describe patients who present with either acute MI or unstable angina (UA). (UA is chest pain or discomfort that's unexpected and usually occurs while at rest. The discomfort may be more severe and prolonged than typical angina, or be the first time a person has angina.)

- A conservative estimate for the number of discharges with ACS from hospitals in 2004 is 840,000. Of these, an estimated 476,000 are male and 364,000 are female. This estimate is derived by adding the first listed inpatient hospital discharges for MI (732,000) to those for UA (108,000). (*NHDS*)
- When including secondary discharge diagnoses in 2004, the corresponding number of inpatient hospital discharges was 1,565,000 unique hospitalizations for ACS, 896,000 for MI, and 669,000 for UA (21,000 hospitalizations received both diagnoses). (*NCHS*)

## Angina Pectoris (AP)

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

## Prevalence

A study of four national cross-sectional health examination studies found that among Americans ages 40–74, the age-adjusted prevalence of AP was higher among women than men. Increases in the prevalence of AP occurred for Mexican-American men and women and African-American women, but were not statistically significant for the latter. (*Ethn Dis. 2003;13:85-93.*)

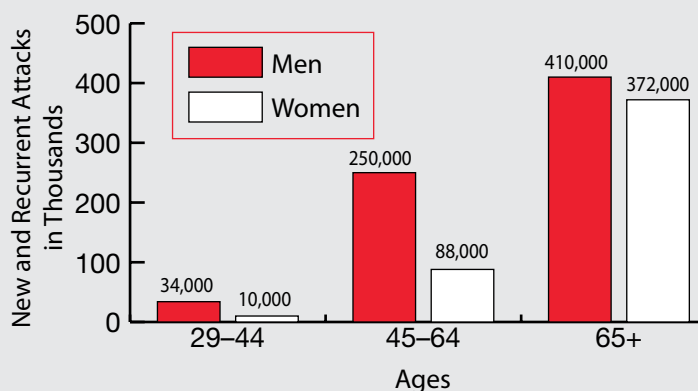
## Incidence

- Only 18 percent of coronary attacks are preceded by long-standing angina. (*NHLBI computation of Framingham Heart Study follow-up since 1986.*)
- The annual rates per 1,000 population of new episodes of angina for non-black men are 28.3 for ages 65–74, 36.3 for ages 75–84, and 33.0 for age 85 and older. For non-black women in the same age groups, the rates are 14.1, 20.0 and 22.9, respectively. For black men, the rates are 22.4, 33.8 and 39.5, and for black women, the rates are 15.3, 23.6 and 35.9, respectively. (*Incidence and Prevalence: 2006 Chart Book on Cardiovascular and Lung Diseases. Bethesda, MD:National Heart, Lung, and Blood Institute, May 2006.*)
- In a study conducted in the United Kingdom, the age-standardized annual incidence of angina was 2.03 in men and 1.89 in women per 100 population. (*JAMA. 2006;293:1404-1411.*)

## Mortality

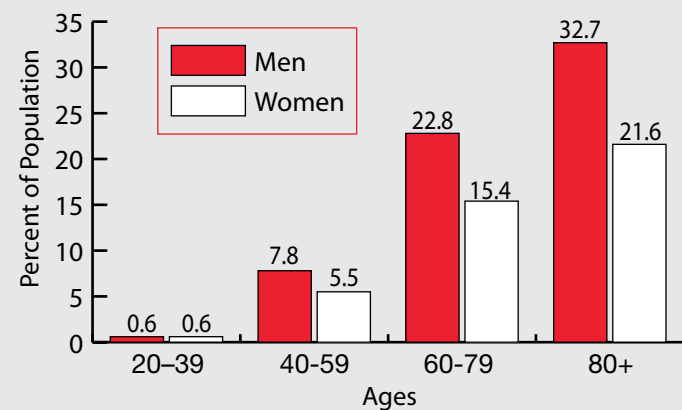
A small number of deaths due to CHD are coded as being from AP. These are included as a portion of total deaths from CHD.

**Annual Number of Adults Having Diagnosed Heart Attack by Age and Sex**  
ARIC: 1987–2000



Source: Extrapolated from rates in the NHLBI's ARIC surveillance study, 1987–2000. These data don't include silent MIs

**Prevalence of Coronary Heart Disease by Age and Sex**  
NHANES: 1999–2004



Source: NCHS and NHLBI.

**For more statistics on coronary heart disease, acute coronary syndrome and angina pectoris, please visit our Web site at [www.americanheart.org/statistics](http://www.americanheart.org/statistics).**

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

## Prevalence

- Among adults age 20 and older, the prevalence of stroke in 2004 was an estimated 5,700,000 (2,400,000 males, 3,300,000 females).

## Incidence

- Each year about 700,000 people experience a new or recurrent stroke. About 500,000 of these are first attacks, and 200,000 are recurrent attacks. (*GCNKSS, FHS, ARIC, NHLBI.*)
- On average, every 45 seconds someone in the United States has a stroke. (*AHA computation.*)
- Each year, about 46,000 more women than men have a stroke. (*GCNKSS*)
- Men's stroke incidence rates are greater than women's at younger ages but not at older ages. The male/female incidence is 1.25 at ages 55–64; 1.50 for ages 65–74; 1.07 at 75–84 and 0.76 at 85 and older. (*ARIC and CHS studies*)
- Blacks have almost twice the risk of first-ever stroke compared with whites. The age-adjusted stroke incidence rates at ages 45–84 are 6.6 per 1,000 population in black males, 3.6 in white males, 4.9 in black females and 2.3 in white females. (*ARIC*)
- The Brain Attack Surveillance in Corpus Christi project (BASIC) clearly demonstrated an increased incidence of stroke among Mexican Americans compared with non-Hispanic whites in this Texas community. The crude cumulative incidence was 168/10,000 in Mexican Americans and 136/10,000 in non-Hispanic whites.
- Of all strokes, 87 percent are ischemic; intracerebral and subarachnoid hemorrhage strokes make up the remainder. (*NHLBI: pooled data from ARIC, CHS, and FHS.*)
- When considered separately from other cardiovascular diseases, stroke ranks No. 3 among all causes of death, behind diseases of the heart and cancer. (*NCHS mortality data*)
- On average, every three to four minutes someone dies of a stroke. (*NHLBI.*)
- Among persons ages 45–64, 8–12 percent of ischemic strokes and 37–38 percent of hemorrhagic strokes result in death within 30 days, according to the ARIC study of the NHLBI. (*Stroke. 1999;30:736-743.*)
- From 1994–2004, the stroke death rate fell 20.4 percent and the actual number of stroke deaths declined 6.7 percent. (*NCHS. AHA/NHLBI computations based on latest mortality data.*)
- The 2004 overall death rate for stroke was 50.0. Death rates were 48.1 for white males and 73.9 for black males; 47.4 for white females and 64.9 for black females.
- Because women live longer than men, more women than men die of stroke each year. Women accounted for 61.0 percent of U.S. stroke deaths in 2004. (*AHA computation.*)

## Mortality

Stroke accounted for about one of every 16 deaths in the United States in 2004. About 50 percent of stroke deaths in 2003 occurred out of hospital. Stroke mortality for 2004 was 150,147 (58,660 males, 91,487 females). (*Vital Statistics of the U.S., Data Warehouse, NCHS. <http://www.cdc.gov/nchs/datawh.htm>.*)

## Stroke Risk Factors

- The relative risk of stroke in heavy smokers (more than 40 cigarettes a day) is twice that of light smokers (less than 10 cigarettes per day). Stroke risk decreases significantly two years after cessation of cigarette smoking and is at the level of nonsmokers by five years. (*JAMA. 1988;259:1025-1029.*)
- Atrial fibrillation (AF) is an independent risk factor for stroke, increasing risk about five-fold. (*Stroke. 1991;22:983-988.*)
- Blood pressure (BP) is a powerful determinant of stroke risk. Subjects with BP less than 120/80 mm Hg have about half the lifetime risk of stroke compared to subjects with hypertension. (*Stroke. 2006;37:345-350.*)
- A study of over 37,000 women age 45 or older participating in the Women's Health Study suggests that a healthy lifestyle consisting of abstinence from smoking, low BMI, moderate alcohol consumption, regular exercise and healthy diet was associated with a significantly reduced risk of total and ischemic stroke but not of hemorrhagic stroke. (*Arch Intern Med. 2006;166:1403-1409.*)



- The Northern Manhattan Study (NOMAS)—which included white, black and Hispanic men and women in an urban setting—showed a decrease in ischemic stroke risk associated with physical activity levels across all racial/ethnic and age groups and for each gender (odds ratio = 0.37). (*Stroke*. 1998;29:380-387.)
- The risk of ischemic stroke or intracerebral hemorrhage during pregnancy and the first six weeks postpartum was 2.4 times greater than for nonpregnant women of similar age and race, according to the Baltimore–Washington Cooperative Young Stroke Study. (*N Engl J Med*. 1996;335:768-774.)
- Among postmenopausal women who are generally healthy, the Women’s Health Initiative primary prevention clinical trial among 16,608 women (95 percent of whom had no pre-existing cardiovascular disease [CVD]) found that estrogen plus progestin (PremPro) increased ischemic stroke risk by 44 percent, with no effect on hemorrhagic stroke. (*JAMA*. 2003;289:2673-2684.)
- The Women’s Estrogen for Stroke Trial (WEST) found that estrogen alone (1 mg of 17B-estradiol) in women with a mean age of 71 years also had no significant overall effect on recurrent stroke or fatality, but there was an increased rate of fatal stroke and an early rise in overall stroke rate in the first six months. (*N Engl J Med*. 2001;345:1243-1249.)
- Clinical trials data indicate that estrogen plus progestin, as well as estrogen alone, increase stroke risk in postmenopausal, generally healthy women, and provide no protection for women with established heart disease. (*JAMA*. 2003;289:2673-2684; *JAMA*. 2002;288:321-333.)
- A meta-analysis of reports of 31 observational studies conducted mainly in the United States and Europe found that moderate and high levels of leisure-time and occupational physical activity protected against total stroke, hemorrhagic stroke and ischemic stroke. (*Int J Epidemiol* 2004;33:787-798.)
- Physical activity — be it from sports, during leisure time or at work — was related to reduced risk of ischemic stroke, according to a follow-up of the ARIC cohort. (*Stroke*. 1999;30:1333-1339.)
- Physical activity reduces stroke risk. Results from the Physicians’ Health Study showed a lower stroke risk associated with vigorous exercise among men. The Harvard Alumni Study also showed a decrease in total stroke risk in men who were highly physically active (relative risk = 0.82). (*Stroke*. 1998;29:2049-2054.)

**Regular physical activity is linked to lower stroke risk.**

## Awareness of Stroke Warning Signs and Risk Factors

- 2001 data from the BRFSS survey in 17 states and the U.S. Virgin Islands showed that public awareness of the major stroke warning signs was high.
  - Sudden numbness or weakness of the face, arm or leg — 94.1 percent
  - Sudden confusion, trouble speaking or understanding — 87.9 percent
  - Sudden trouble walking, dizziness or loss of balance or coordination — 85 percent
  - Sudden trouble seeing in one or both eyes — 68.1 percent
  - Sudden severe headache with no known cause — 61.3 percent
  - 37.8 percent incorrectly reported sudden chest pain as a sign of stroke. (*MMWR Morb Mortal Wkly Rep*. 2004;53[17]:359-362.)
- A study of over 2,100 respondents to a random-digit telephone survey in Cincinnati, Ohio, in 2000, showed that 70 percent of respondents correctly named at least one established stroke warning sign (vs. 57 percent in 1995) and 72 percent correctly named at least one established risk factor (vs. 68 percent in 1995). (*JAMA*. 2003;289:343-346.)
- Only 17.2 percent of adults correctly classified all stroke symptoms and indicated that they would call 9-1-1 if they thought someone was having a stroke, according to 2001 BRFSS data from over 61,000 adults. (*Am J Prev Med*. 2003;25:315-319.)

## Physical Activity in the Prevention of Stroke

- In an evaluation of walking and sports participation in 73,265 men and women in Japan, risk of stroke death was reduced by 29 percent and 20 percent, respectively, in those pertaining to the highest-intensity category. (*J Am Coll Cardiol* 2005;46:1761-1767.)
- In a study of 47,721 men and women in Finland, significant trends toward lower stroke risk were associated with moderate and high levels of leisure-time physical activity and active commuting. (*Stroke* 2005;36:1994-1999.)

- Insufficient awareness persists in the general medical community regarding risk factors, warning signs and prevention strategies for stroke. A survey of 308 internal medicine residency programs showed only 46 percent required neurology compared with 97 percent for cardiology. Underrepresentation of neurology in internal medicine residency programs may contribute to stroke outcome. (*Cardiol Rev.* 2005;13[20]:73-75.)
- In 2004, 800 adults age 45 and older were surveyed to assess their perceived risk for stroke and their history of stroke risk factors. Overall, 39 percent perceived themselves to be at risk. Younger age, current smoking, a history of diabetes, high blood pressure, high cholesterol, heart disease and stroke/transient ischemic attack (TIA) were independently associated with perceived risk for stroke. Respondents with AF were no more likely to report being at risk than respondents without AF. Perceived risk for stroke increased as the number of risk factors increased. However, 46 percent with three or more risk factors did not perceive themselves to be at risk. (*Prev Med.* 2005;41[3-4]:791-794.)

## Aftermath

- Stroke is a leading cause of serious, long-term disability in the United States. (*SIPP; MMWR Morb Mortal Wkly Rep.* 2001;50[7]:120-125.)
- The median time from stroke onset to arrival in an ER is between three and six hours, according to a study of at least 48 unique reports of prehospital delay time for patients with stroke, TIA or stroke-like symptoms. Improved clinical outcome at three months was seen for patients with acute ischemic stroke when intravenous thrombolytic treatment

was started within three hours of the onset of symptoms. (*Neuroepidemiology.* 2001;20:65-76.)

- The percent who die one year following a first stroke (based on pooled data from the FHS, ARIC and CHS studies of the NHLBI):
  - at age 40 and older, 21 percent of men and 24 percent of women.
  - at ages 40–69: 14 percent of white men, 20 percent of white women, 19 percent of black men and 19 percent of black women.
  - at age 70 and older: 24 percent of white men, 27 percent of white women, 25 percent of black men and 22 percent of black women.
- In the NHLBI's FHS, among ischemic stroke survivors who were at least 65 years old, these disabilities were observed at six months post-stroke: (*J Stroke Cerebrovasc Dis.* 2003;12:119-126.)
  - 50 percent had some hemiparesis.
  - 30 percent were unable to walk without some assistance.
  - 26 percent were dependent in activities of daily living.
  - 19 percent had aphasia.
  - 35 percent had depressive symptoms.
  - 26 percent were institutionalized in a nursing home.

## Hospital Discharges/ Ambulatory Care Visits

- From 1979–2004, the number of inpatient discharges from short-stay hospitals with stroke as the first listed diagnosis increased 21 percent to 906,000. (*NHDS, NCHS, AHA computation.*)

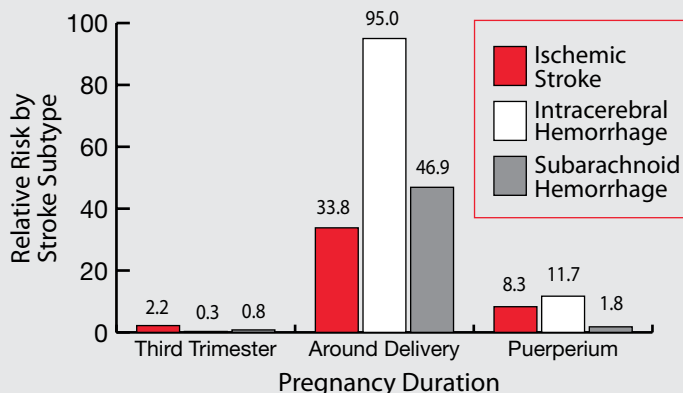
## Cost

- The estimated direct and indirect cost of stroke in the United States for 2007 is \$62.7 billion.

## Stroke in Children

- Stroke in children has a peak in the perinatal period. In the National Hospital Discharge Survey from 1980–98, the rate of stroke for infants less than 30 days old (per 100,000 live births per year) was 26.4, with rates of 6.7 for hemorrhagic stroke and 17.8 for ischemic stroke. (*Pediatrics.* 2002;109:116-123.)
- Compared to the stroke risk of white children, black children have a higher relative risk of 2.12, Hispanics have a lower relative risk of 0.76, and

**Risk of Stroke in Women in the Third Trimester, Peri- and Post-Partum Period Versus Risk of Nonpregnant Women and Women in the First 2 Trimesters**



Source: Salonen RH, et al. Increased risk of circulatory diseases in late pregnancy and puerperium. *Epidemiology* 2001;12:456–60.

Asians have a similar risk. Boys have a 1.28-fold higher risk of stroke than girls. There are no ethnic differences in stroke severity or case-fatality, but boys have a higher case-fatality rate for ischemic stroke. (*Neurology*. 2003;61:189-194.)

- Cerebrovascular disorders are among the top 10 causes of death in children, with rates highest in the first year of life. (*Pediatrics*. 2002;109:116-123.)
- From 1979–98 in the United States, childhood mortality from stroke declined by 58 percent overall, with reductions in all major subtypes. (*Neurology*. 2002;59:34-39.)

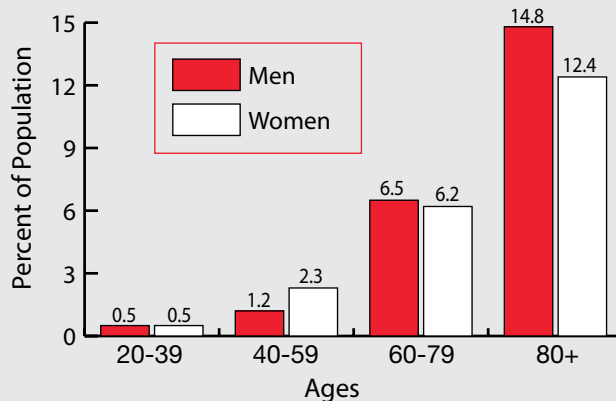
## Transient Ischemic Attack (TIA)

(A TIA is a mini-stroke that lasts less than 24 hours.)

- The prevalence of TIA in men is estimated to be 2.7 percent for ages 65–69 and 3.6 percent for ages 75–79. For women, TIA prevalence is estimated to be 1.6 percent for ages 65–69 and 4.1 percent for ages 75–79. (*Ann Epidemiol*. 1993;3:504-507.)
- Approximately 15 percent of all strokes are preceded by a TIA. (*Cerebrovasc Dis*. 1996;6 [suppl 1]:26-33.)
- After TIA, the 90-day risk of stroke is 3–17.3 percent, highest within the first 30 days. (*Neurology*. 2004;62:2015-20; *Stroke*. 2004;35:1842-6; *Stroke*. 2005;36:720-3; *BMJ*. 2004;328:326; *Neurology*. 2003;60:1429-34.)
- Within a year of TIA, up to a quarter of patients will die. (*Neurology*. 2004;62:2015-2020; *Neurology*. 2004;62:S20-S21)
- Individuals who have a TIA have a 10-year stroke risk of 18.8 percent and a combined 10-year stroke, myocardial infarction or vascular death risk of 42.8 percent (4 percent a year). (*J Neurol Neurosurg Psychiatry*. 2003;74:577-580.)

## Prevalence of Stroke by Age and Sex

NHANES: 1999–2004



Source: NCHS and personal communication with NHLBI.

**For more statistics on stroke,  
please visit our Web site at  
[www.americanheart.org/statistics](http://www.americanheart.org/statistics).**

(ICD/9 401-404) (ICD/10 I10-I15)

## Prevalence

The overall estimated 2004 prevalence for high blood pressure (HBP) was 72,000,000 (33,000,000 males, 39,000,000 females). HBP is defined as:

- untreated systolic pressure of 140 mm Hg or higher, or diastolic pressure of 90 mm Hg or higher or taking antihypertensive medicine; or
- being told at least twice by a physician or other health professional that you have HBP.
- Nearly one in three U.S. adults has HBP. (*Hypertension*. 2004;44:398-404.)
- A higher percentage of men than women have HBP until age 45. From ages 45–54, the percentage of men and women is similar. After that, a much higher percentage of women have HBP than men do. (*Health, United States, 2005*.)
- HBP is two to three times more common in women taking oral contraceptives, especially in obese and older women, than in women not taking them. (*Hypertension*. 2003;42:1206-1252.)
- Data from the BRFSS study of the CDC showed that in 2005, 25.5 percent of respondents had been told they had HBP. (<http://apps.nccd.cdc.gov/brfssl/index.asp>)

**HBP is associated with shorter life expectancy.**

## Race/Ethnicity and HBP

- The prevalence of hypertension in blacks in the United States is among the highest in the world, and it is increasing. From 1988–94 to 1999–2002, the prevalence of HBP in adults increased from 35.8 percent to 41.4 percent among blacks, and it was particularly high among black women, at 44.0 percent. Prevalence among whites also increased, from 24.3 percent to 28.1 percent. (*Arch Intern Med*. 2005;165:2098-2104.)
- 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 5 and 6*)

- Compared with white women, black women have an 85 percent higher rate of ambulatory medical care visits for HBP. (*Vital Health Stat 13*. 2001;149:1-46.)

## Mortality

HBP mortality in 2004 was 54,186 (22,795 males, 31,392 females).

- From 1994–2004, the age-adjusted death rate from HBP increased 25.2 percent and the actual number of deaths rose 54.6 percent. (*NCHS and NHLBI*)
- The 2004 overall death rate from HBP was 17.9. Death rates were 15.6 for white males, 49.9 for black males, 14.3 for white females and 40.6 for black females. (*NHLBI computation based on annual NCHS mortality data*.)

## Aftermath

- About 69 percent of people who have a first heart attack, 77 percent who have a first stroke, and 74 percent with heart failure have blood pressure (BP) higher than 140/90 mm Hg. (*NHLBI unpublished estimates from ARIC, CHS and FHS Cohort and Offspring Studies*)
- People with systolic BP of 160 mm Hg or higher and/or diastolic BP of 95 mm Hg or higher have a relative risk for stroke about four times greater than for those with normal BP. (*Hypertens Res*. 1994;17[suppl 1]:S23-S32.)
- Hypertension precedes the development of heart failure in 91 percent of cases, and is associated with a two to three times higher risk for developing heart failure. (*FHS; NHLBI; JAMA*. 1996;275:1557-1562.)
- Data from the FHS indicate that hypertension is associated with shorter overall life expectancy as well as shorter life expectancy free of cardiovascular disease (CVD) and more years lived with CVD. (*Hypertension*. 2005;46:280-286.)



## Awareness and Control

- Data from NHANES 1999–2004 showed that of those with hypertension age 18 and older, 71.8 percent were aware of their condition, 61.4 percent were under current treatment, 35.1 percent had it under control and 64.9 percent did not have it controlled. (*NCHS and NHLBI*.)
- Data from the 2005 BRFSS survey indicate that overall, 25.5 percent of adults age 18 and older had been told that they had HBP. ([www.cdc.gov/brfssl](http://www.cdc.gov/brfssl))
- According to CDC analysis of death certificate data from 1995 and 2002, Puerto-Rican Americans had consistently higher hypertension-related mortality (HRM) than all other Hispanic subpopulations. Puerto-Rican Americans had the highest death rate among all Hispanic subpopulations (154.0), and Cuban Americans had the lowest (82.5). The age-standardized HRM rate was 127.2 per 100,000 population for all Hispanics, similar to that of non-Hispanic whites (135.9). The age-standardized rate for Hispanic women (118.3) was substantially lower than that observed for Hispanic men (135.9). (*MMWR Morb Mortal Wkly Rep. 2006; 55(7): 177-180.*)

## Cost

- The estimated direct and indirect cost of HBP in the United States for 2007 is \$66.4 billion.

## Pre-Hypertension

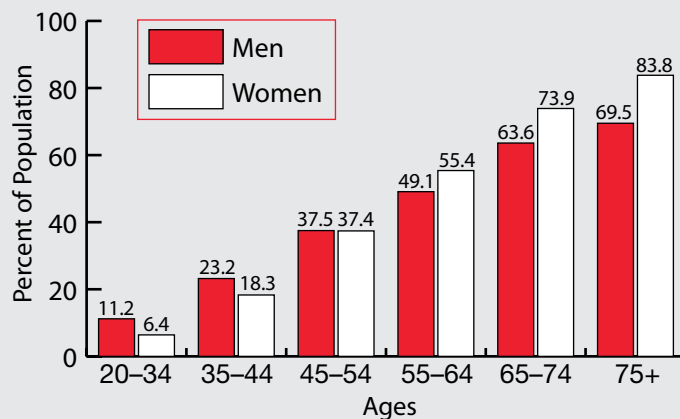
- “Pre-hypertension” is untreated systolic pressure of 120–139 mm Hg, or untreated diastolic pressure of 80–89 mm Hg, and not being told on two occasions by a doctor or other health professional that you have hypertension.
- It is estimated that 37.4 percent of the U.S. population age 20 and older has pre-hypertension, including 41,900,000 million men and 27,800,000 women. (*Med Sci Monit. 2005;11:CR403-409.*)

## End-Stage Renal Disease (ESRD)

(ICD/10 N18.0)

- ESRD (also called end-stage kidney disease) is a condition that is most commonly associated with diabetes or high blood pressure and diabetes, and occurs when the kidneys can no longer function normally on their own.

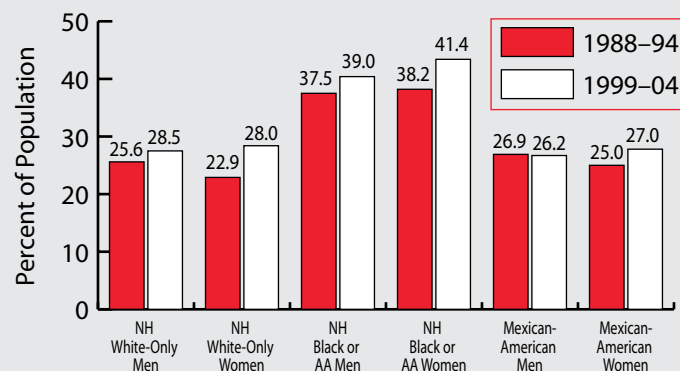
**Prevalence of High Blood Pressure in Americans Age 20 and Older by Age and Sex**  
NHANES: 1999–2004



Source: NCHS and NHLBI.

**Age-Adjusted Prevalence Trends for High Blood Pressure in Adults Age 20 and Older by Race/Ethnicity, Sex and Survey**

NHANES: 1988–94 and 1999–2004



Source: NCHS and NHLBI; *Health, United States, 2005*.  
NH = non-Hispanic. AA = African American

- The incidence of reported ESRD has almost doubled in the past 10 years. (*NHLBI*)
- In 2003, 102,567 new cases of ESRD were reported. ([www.usrds.org](http://www.usrds.org))
- Nearly 453,000 patients were being treated for ESRD by the end of 2003. ([www.usrds.org](http://www.usrds.org))
- 82,588 patients died from ESRD in 2003. ([www.usrds.org](http://www.usrds.org))
- More than 15,700 kidney transplants were performed in 2003. ([www.usrds.org](http://www.usrds.org))
- Diabetes continues to be the most common reported cause of ESRD. ([www.usrds.org](http://www.usrds.org))

# Congenital Cardiovascular Defects

(ICD/9 745-747) (ICD/10 Q20-Q28)

Congenital cardiovascular defects, also known as congenital heart defects, are structural problems arising from abnormal formation of the heart or major blood vessels. Common complex defects include:

- tetralogy of Fallot (9–14 percent)
- transposition of the great arteries (10–11 percent)
- atrioventricular septal defects (4–10 percent)
- coarctation of the aorta (8–11 percent)
- hypoplastic left heart syndrome (4–8 percent)
- ventricular septal defects (VSDs), the most common defect. Many close spontaneously, but VSDs still account for 14–16 percent of defects requiring an invasive procedure within the first year of life. (*Perspectives in Pediatric Cardiology. Vol. 6. Armonk, N.Y.: Futura; 1998*)

## Prevalence

As of 2002, the prevalence of congenital cardiovascular disease in the United States was estimated to range from 650,000 to 1.3 million. (*Am Heart J. 2004;147:425-439.*)

## Incidence

- Nine (9.0) cardiovascular defects per 1,000 live births are expected, or 36,000 infants per year in the United States have a congenital heart defect. (*Surgery of Congenital Heart Disease: Pediatric Cardiac Care Consortium 1984-1995. Armonk, NY: Futura Publishing Co; 1998:20.*)
- Some studies suggest that as many as 5 percent of newborns, or 200,000 per year, are born with tiny muscular ventricular septal defects, almost all of which close spontaneously. These defects nearly never require treatment. (*J Am Coll Cardiol. 1995;26:1545-1548; Arch Dis Child Fetal Neonatal Ed. 1999;81:F61-F63.*)

## Mortality

- Congenital cardiovascular defects, total mention mortality — 6,110.
- Congenital cardiovascular disease is the most common cause of infant death from birth defects;

one in three infants who die from a birth defect have a heart defect. (*NVSS Final Data for 2000*)

- The 2003 overall death rate for congenital cardiovascular defects was 1.4. Death rates were 1.5 for white males, 1.8 for black males, 1.2 for white females and 1.4 for black females. Crude infant death rates (under 1 year) were 39.5 for white infants and 52.3 for black infants. In 2000, 213,000 life-years were lost before age 65 due to deaths from congenital cardiovascular disease. This is nearly equivalent to the life-years lost from leukemia, prostate cancer and Alzheimer's disease combined. (*NCHS, NHLBI*)

### Congenital Cardiovascular Defects: Mortality, Hospital Discharges

Population Group	Mortality 2003: All Ages	Hospital Discharges 2004: All Ages
Both sexes	3,983	72,000
Males	2,115 (53.1%)*	35,000
Females	1,868 (46.9%)*	37,000
White males	1,375	—
White females	1,245	—
Black males	345	—

NOTE: — = data not available. \* These percentages represent the portion of total congenital CV mortality that is males vs. females. Source: Mortality: NCHS. Hospital discharges: NHDS.

- Mortality from congenital defects has been declining. From 1979–97, age-adjusted death rates from all defects declined 39 percent and deaths tended to occur at progressively older ages. (*Circulation. 2001;103:2376-2381.*)
- From 1993–2003, death rates for congenital cardiovascular defects declined 31 percent, while the actual number of deaths declined 26 percent.

## Prevalence

- Overall estimated 2004 prevalence of heart failure (HF) in adults age 20 and older: 5,200,000 (2,600,000 males, 2,600,000 females).

## Incidence

- Based on the 44-year follow-up of the NHLBI's FHS (*Hurst W. The Heart, Arteries and Veins. 10th ed. New York, NY: McGraw-Hill; 2001*)...
  - HF incidence approaches 10 per 1,000 population after age 65.
  - Seventy-five percent of HF cases have antecedent hypertension.
- Based on 1971–96 data from the NHLBI's FHS (*Circulation. 2002;106:3068-3072*)...
  - At age 40, the lifetime risk of developing congestive heart failure (CHF) for both men and women is one in five.
  - At age 40, the lifetime risk of CHF occurring without antecedent MI is one in nine for men and one in six for women.
  - The lifetime risk doubles for people with blood pressure greater than 160/90 mm Hg versus those with blood pressure less than 140/90 mm Hg.
- A community-based cohort study conducted in Olmsted County, Minnesota, showed that the incidence of HF (ICD9/428) has not declined during two decades, but survival after onset has increased overall, with less improvement among women and elderly persons. (*JAMA. 2004;292:344-350.*)

## Risk Factors

- Data from the FHS indicate that hypertension is a very common risk factor for HF and it contributes to a large proportion of HF cases. (*JAMA. 1996;275:1557-1562.*)
- A study of the predictors of HF among women with coronary heart disease found that diabetes was the strongest risk factor. (*Circulation. 2004;110:1424-1430.*)
- The prevalence of diabetes is increasing among older persons with HF, and diabetes is a significant independent risk factor for death in these individuals. Mayo Clinic researchers found that the odds of having diabetes for those first diagnosed with HF in 1999 was nearly four times higher than those diagnosed 20 years earlier. (*N Engl J Med. 2006;355:251-259.*)

## Mortality

- Heart failure, estimated 2004 mortality—57,700.
- Based on the 44-year follow-up of the NHLBI's FHS...
  - Eighty percent of men and 70 percent of women under age 65 who have HF will die within eight years.
  - After HF is diagnosed, survival is poorer in men than in women, but fewer than 15 percent of women survive more than eight to 12 years. The one-year mortality rate is high, with one in five dying.
  - In people diagnosed with HF, sudden cardiac death occurs at six to nine times the rate of the general population.
- From 1994–2004, deaths from HF increased 28 percent. In the same time period, the death rate declined 2.0 percent. (*NCHS and NHLBI*)
- The 2004 overall death rate for HF was 19.1. Death rates were 20.3 for white males, 22.9 for black males, 18.3 for white females and 19.0 for black females. (*NCHS and NHLBI*)

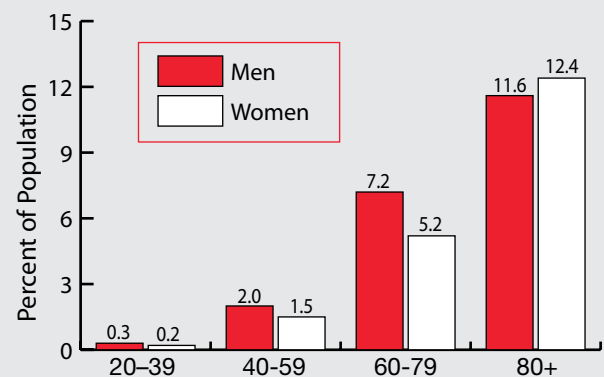
## Hospital Discharges

- Hospital discharges for HF rose from 399,000 in 1979 to 1,099,000 in 2004, an increase of 175 percent. (*NHDS, NCHS and NHLBI*)

## Cost

- The estimated direct and indirect cost of HF in the United States for 2007 is \$33.2 billion.

**Prevalence of Heart Failure by Sex and Age**  
NHANES: 1999–2004



Source: NCHS and NHLBI.

**Peripheral arterial disease (PAD)** affects about 8 million Americans and is associated with significant morbidity and mortality. (*JAMA* 2001;286:1317–24)

- PAD affects 12–20 percent of Americans age 65 and older. Despite its prevalence and cardiovascular risk implications, only 25 percent of PAD patients are undergoing treatment. (*J Vasc Interv Radiol*. 2002;13:7-11.)
- In the general population, only about 10 percent of persons with PAD have the classic symptoms of intermittent claudication (intermittent leg pain). About 40 percent do not complain of leg pain, while the remaining 50 percent have a variety of leg symptoms different from classic claudication. (*JAMA*. 2001;286:1317-1324; *Circulation*. 1985;71:516-522.) However, in an older, disabled population of women, as many as two-thirds of individuals with PAD had no leg symptoms associated with exercise or exertion. (*Circulation*. 2000;101:1007-1012.)
- Intermittent claudication is present in less than 1 percent of individuals under age 50 and approximately 5 percent or more in those over age 80. (*Circulation*. 2006 Mar 21;113[11]:e463-e654.)
- The risk factors for PAD are similar to those for coronary heart disease (CHD), although diabetes and cigarette smoking are particularly strong risk factors for PAD. (*Circulation*. 2006 Mar 21;113[11]:e463-654; *Am J Epidemiol*. 1989;129:1110-1119.)
- Persons with PAD have impaired function and quality of life. This is true even for persons who do not report leg symptoms. Furthermore, PAD patients, including those who are asymptomatic, experience significant decline in lower extremity functioning over time. (*Ann Intern Med*. 2002;136:873-883; *JAMA*. 2004;292:453-461.)
- PAD is a marker for systemic atherosclerotic disease. Persons with PAD, compared to those who do not have it, have four to five times the risk of dying of a CVD event, resulting in two to three times higher total mortality risk. (*NEJM*. 1992;326:381-6; *JAMA*. 1993;270:487-489.)
- In the FHS, the annual mortality rate was almost four times greater in subjects with intermittent claudication. In a major cohort study, investigators observed a risk for all-cause mortality in these subjects that was 3.1 times higher than that for patients without PAD. In addition, PAD patients had a 5.9-times higher risk for death from cardiovascular disease (CVD) complications and a 6.6-times higher risk for death from CHD specifically. (*Circulation*. 2006 Mar 21;113[11]:e463-654; *Clin Cornerstone*. 2002;4:1-15.)
- African-American ethnicity was a strong and independent risk factor for PAD. PAD was not attributable to higher levels of diabetes, hypertension and body mass index. African Americans had a higher PAD prevalence than non-Hispanic whites. There was no evidence of a greater susceptibility of African Americans to CVD risk factors as a reason for their higher PAD prevalence. (*Circulation*. 2005;112:2703-2707.)
- Data from NHANES 1999–2000 show that even low blood levels of lead and cadmium may increase the risk of PAD. Exposure to these two metals is possible through cigarette smoke. The risk was 2.8 for high levels of cadmium and 2.9 for high levels of lead. The odds ratio of PAD for current smokers was 4.13 compared to people who had never smoked. (*Circulation*. 2004;109:3196-3201.)
- Results from the NHANES 1999–2000 survey of the NCHS showed a remarkably high prevalence of PAD among patients with renal insufficiency. (*Circulation*. 2004;109:320-323.)
- Available evidence suggests that the prevalence of PAD in persons of Hispanic origin is similar to or slightly higher than in Caucasians. (*Circulation*. 2005;112:2703-2707.)

**For more statistics on PAD and other cardiovascular diseases, including arrhythmia, diseases of the arteries, bacterial endocarditis, cardiomyopathy, rheumatic fever/rheumatic heart disease, valvular heart disease, and venous thromboembolism, please visit our Web site, at [www.americanheart.org/statistics](http://www.americanheart.org/statistics).**



## Physical Inactivity

### Regular Leisure-time Physical Activity

Population Group	Prevalence 2004
Total Population	30.1%
Total Males	31.4%
Total Females	29.0%
NH White-only males	33.4%
NH White-only females	31.8%
NH Black-only males	29.5%
NH Black-only females	19.6%
Hispanic or Latino males	24.9%
Hispanic or Latino females	21.8%

NOTE: Regular leisure-time physical activity is defined as light-moderate activity for ≥30 minutes, ≥5 times per week; or vigorous activity for ≥20 minutes, ≥3 times per week.

Source: NHIS 2004. Data are age-adjusted for adults age 18+. NH = non-Hispanic.

## Prevalence

### Youth

- In 2005, 43.8 percent of male and 27.8 percent of female students in grades 9–12 met currently recommended levels of physical activity (PA). Among these students, 37.1 percent of males and 29.0 percent of females attended classes daily and 87.2 percent of males and 80.3 percent of females exercised or played sports for more than 20 minutes during an average physical education class. (*MMWR Morb Mortal Wkly Rep.* 2006;55[SS-5]:1-108.)
- 61.5 percent of children ages 9–13 don't participate in any organized PA during their nonschool hours, and 22.6 percent don't engage in any free-time PA, according to 2002 data from the Youth Media Campaign Longitudinal Study (YMCLS) of the CDC. Non-Hispanic black and Hispanic children are significantly less likely than non-Hispanic white children to report involvement in organized activities, as are children with parents who have lower incomes and education levels. (*MMWR Morb Mortal Wkly Rep.* 2003;52[33]:785-788.)
- By the age of 16 or 17, 31 percent of white girls and 56 percent of black girls report no habitual leisure-time activity. (*N Engl J Med.* 2002;347:709-715.)

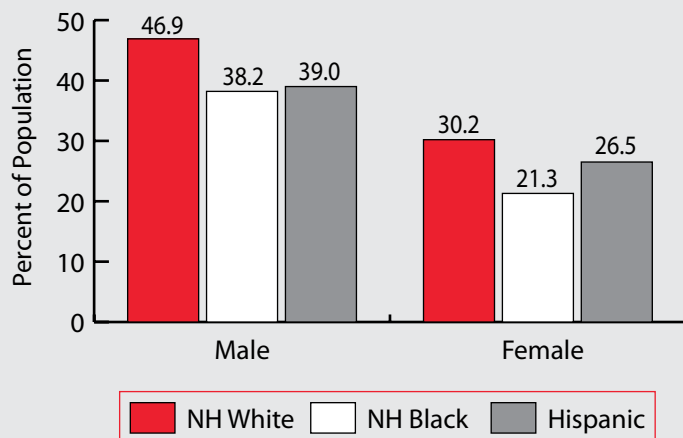
- Lower levels of parental education are associated with greater decline in activity for white girls at both younger and older ages. For black girls, this association is seen only at the older ages.
- Cigarette smoking is associated with decline in activity among white girls. Pregnancy is associated with decline in activity among black girls but not among white girls.
- A higher body mass index (BMI) is associated with greater decline in activity among girls of both races.

- The prevalence of high school students who played video or computer games or used a computer for something that was not schoolwork for three or more hours a day was 21.1 percent, according to data from the CDC's YRBS 2005 survey. The prevalence of computer use was higher among male (27.4 percent) than female (14.8 percent) students; higher among non-Hispanic white male (25.4 percent), non-Hispanic black male (34.9 percent), and Hispanic male (24.4 percent) than non-Hispanic white female (13.7 percent), non-Hispanic black female (16.1 percent), and Hispanic female (14.9 percent) students, respectively. (*MMWR Morb Mortal Wkly Rep.* 2006;55[SS-5]:1-108.)
- 37.2 percent of students watched television three or more hours on an average school day, according to data from the CDC's YRBS 2005 survey. The prevalence was higher among non-Hispanic black (64.1 percent) than non-Hispanic white (29.2 percent) and Hispanic (45.8 percent) students; higher among non-Hispanic black female (64.5 percent) than non-Hispanic white female (28.1 percent) and Hispanic female (45.8 percent) students; higher among non-Hispanic black male (63.5 percent) than non-Hispanic white male (30.2 percent) and Hispanic male (45.8 percent) students. (*MMWR Morb Mortal Wkly Rep.* 2006;55[SS-5]:1-108.)

### Adults

- Among Asians and Native Hawaiians or other Pacific Islanders, 21.2 percent of men and 27.0 percent of women reported no leisure-time PA, according to 2001–03 data from the BRFSS (CDC)

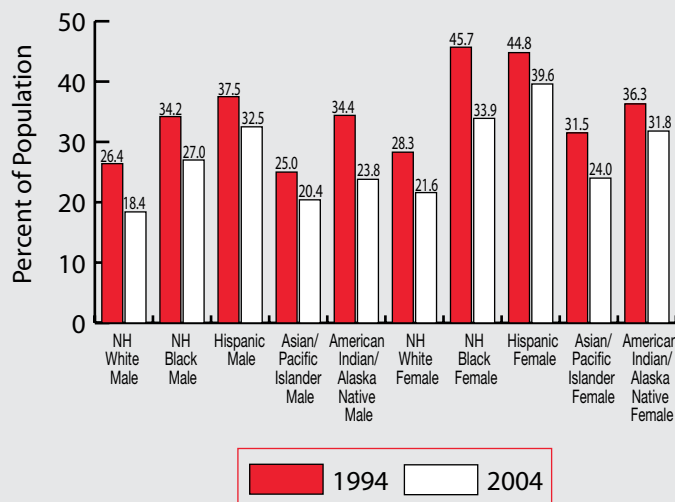
### Prevalence of Students in Grades 9–12 Who Met Currently Recommended Levels of Physical Activity During the Past 7 Days by Race/Ethnicity and Sex YRBS: 2005



Note: “Currently recommended levels” is defined as activity that increased their heart rate and made them breathe hard some of the time for a total of at least 60 minutes/day on 5 or more of the 7 days preceding the survey.

Source: *MMWR, Morb Mortal Wkly Rep. 2006;55(SS-5); 1-108; MMWR, Morb Mortal Wkly Rep. 2004;53(33); 756-760. NH = non-Hispanic.*

### Prevalence of Leisure-Time Physical Inactivity in Americans Age 18 and Older by Race/Ethnicity and Sex BRFSS: 1994 and 2004



Source: *MMWR Morb Mortal Wkly Rep. 2005;54(39). NH = non-Hispanic.*

surveys. Of these, 21.5 percent were overweight (BMI 25.0–29.9) and 23.8 percent were obese (BMI 30.0 and over). (*MMWR Morb Mortal Wkly Rep. 2004;53[33]:756-760.*)

- 76.2 percent of respondents age 18 and older had participated in any PA in the past month, according to 2005 data from the BRFSS (CDC) survey. The highest percentage was in Minnesota (83.8 percent) and the lowest was in Louisiana (66.6 percent). Overall, the percentage of adults

with 20+ minutes of PA, three or more days per week, was 72.5 percent. The highest percentage was in Kentucky (83.2 percent) and the lowest was in California (63.8 percent). Overall, adults with 30+ minutes of moderate PA five or more days per week, or vigorous PA for 20 or more minutes three or more days per week, was 50.9 percent. The highest percentage was in Kentucky (65.3 percent) and the lowest was in Alaska (40.8 percent). (*www.cdc.gov/brfssl*)

- Based on data from the 1999–2001 NHIS surveys (*Vital Health Stat 10. 2004;[219]:1-79*)...
  - 31.3 percent of U.S. adults age 18 and older engage in any regular leisure-time PA.
  - Men (64.2 percent) were more likely than women (59.0 percent) to engage in at least some leisure-time PA.
  - Engaging in any PA declined steadily with age from 39.7 percent of adults ages 18–24 to 15.6 percent of those age 75 and older.
  - Engaging in any regular leisure-time PA was more prevalent among white adults (32.7 percent) than among Asian adults (27.8 percent) and black adults (23.9 percent).
  - Non-Hispanic white adults (65.7 percent) were more likely than non-Hispanic black adults (49.3 percent) and Hispanic adults (45.0 percent) to engage in at least some leisure-time PA.
  - Adults with a graduate degree (80.6 percent) were about twice as likely as adults with less than a high school diploma (41.0 percent) to engage in at least some leisure-time PA.
  - Adults who had incomes four times the poverty level or more (39.9 percent) were about twice as likely as adults with incomes below the poverty level (22.6 percent) to engage in any regular PA.
  - Widowed adults (23.6 percent) were less likely than never-married adults (33.0 percent), married adults (31.1 percent) and divorced or separated adults (29.1 percent) to engage in regular PA.
  - Adults living in the West (65.3 percent) were more likely than adults living in the South (56.4 percent) to engage in at least some leisure-time PA.
- The relative risk of coronary heart disease (CHD) associated with physical inactivity ranges from 1.5–2.4, an increase in risk comparable to that observed for high blood cholesterol, high blood pressure (HBP) or cigarette smoking. (*JAMA. 1995;273:402-407.*)
- A study of over 72,000 female nurses indicates that moderate-intensity PA, such as walking, is

associated with a substantial reduction in risk of total and ischemic stroke. (*JAMA*. 2000;283:2961-2967.)

- The prevalence of physical inactivity during leisure time among Mexican Americans is higher than in the general population. (*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).
- Data from the 1999–2003 NHIS survey of the NCHS showed that American Indian or Alaska Native adults age 18 and older were as likely (50.3 percent) as black adults (49.9 percent), and more likely than Asian adults (38.1 percent) and white adults (36.6 percent), to never engage in any leisure-time PA. (*Advance data from vital and health statistics; no. 356*. 2005.)

## Smoking/Tobacco

### Prevalence

#### Youth

- In 2005, in grades 9–12, 31.7 percent of male students and 25.1 percent of female students reported current tobacco use, 19.2 percent of males and 8.7 percent of females reported current cigar use, and 13.6 percent of males and 2.2 percent of females reported current smokeless tobacco use. (*MMWR Morb Mortal Wkly Rep*. 2006;55[SS5]:1-108, 2006.)
- From 1980–2004, the percentage of high school seniors who smoked in the past month decreased 18 percent. This percentage decreased by 5.6 percent in males, 27.8 percent in females, 9 percent in whites and 55.2 percent in blacks or African Americans. (*NCHS; Health, United States, 2005*.)
- An estimated 150,000–300,000 children younger than 18 months of age have respiratory tract infections because of exposure to secondhand smoke. ([www.cdc.gov/tobacco/research\\_data/environmental/lets-fact.htm](http://www.cdc.gov/tobacco/research_data/environmental/lets-fact.htm))

#### Adults

- In 2004, the estimated prevalence for smoking (age 18+) was 46,000,000 (25,100,000 males; 20,900,000 females).
- Since 1965, smoking in the United States has declined by 49 percent among people age 18 and older. (*NCHS; Health, United States, 2005*.)
- Among Americans age 18 and older, 23.4 percent of men and 18.5 percent of women are smokers, putting them at increased risk of heart attack and stroke. (*MMWR Morb Mortal Wkly Rep*. 2005;54[44]:1121-1124.)
- Use of any tobacco product in 2003 was 31.6 percent for white only, 30.0 percent for black or African-American only, 41.8 percent for American Indian or Alaska Native only, 37.0 percent for Native Hawaiian or other Pacific Islander only, 13.8 percent for Asian only and 23.7 percent for Hispanic or Latino, any race. (*Health, United States, 2005*.)
- Smoking prevalence is higher among those with 9–11 years of education (34.0 percent) compared with those with more than 16 years of education (8.0 percent). It's highest among persons living below the poverty level (29.1 percent) compared with other income groups. (*MMWR Morb Mortal Wkly Rep*. 2006;55[SS5]:1-108.)
- Data from the 2004 NHIS survey showed that American Indian or Alaska Native adults age 18 and older were more likely (33.4 percent) to be current smokers than non-Hispanic white adults (22.2 percent), black adults (20.2 percent) and Asian adults (11.3 percent). (*MMWR Morb Mortal Wkly Rep*. 2005;54[44]:1121-1124.)
- 2005 prevalence data from the BRFSS survey showed that overall, 20.6 percent of adults age 18 and older were current smokers. The highest percentage was in Kentucky (28.7 percent) and the lowest was in Utah (11.5 percent). ([www.cdc.gov/brfssl](http://www.cdc.gov/brfssl))

### Incidence

- Each day about 3,900 people ages 12–17 begin smoking cigarettes in the United States. Each day an estimated 1,500 people in this age group become daily smokers. (*Results from the 2004 National Survey on Drug Use and Health*. Rockville, MD: Office

**For more statistics on CVD risk factors,  
please visit our Web site at  
[www.americanheart.org/statistics](http://www.americanheart.org/statistics).**

of Applied Studies, 2005. [SDUH Series H-27. DHHS Publication No. SMA 05-4061.]

- About 80 percent of people who use tobacco begin before age 18, according to a report from the Surgeon General, “Preventing Tobacco Use Among Young People, 1994.” The most common age of initiation is 14–15.

## Mortality

- From 1997–2001, an estimated 437,902 Americans died each year of smoking-related illnesses, and 34.7 percent of these deaths were related to cardiovascular disease. (*MMWR Morb Mortal Wkly Rep.* 2005;54[25]:625-628.)
- On average, male smokers die 13.2 years earlier than male nonsmokers and female smokers die 14.5 years earlier than female nonsmokers. (*The Health Consequences of Smoking: A Report of the Surgeon General, 2004*; [www.cdc.gov/tobaccosgr/sgr\\_2004/index.htm](http://www.cdc.gov/tobaccosgr/sgr_2004/index.htm).)
- From 1997–2001, smoking annually caused 3.3 million years of potential life lost for men and 2.2 million years for women; smoking during pregnancy resulted in an estimated 523 male and 387 female infant deaths annually. (*MMWR Morb Mortal Wkly Rep.* 2005;54[25]:625-628.)
- Cigarette smoking results in a two-to-three-fold risk of dying from CHD. (*Tobacco-Related Mortality, Fact Sheet.* [www.cdc.gov/tobacco/factsheets/Tobacco\\_Related\\_Mortality\\_factsheet.htm](http://www.cdc.gov/tobacco/factsheets/Tobacco_Related_Mortality_factsheet.htm).)
- An estimated 35,052 nonsmokers die from CHD each year as a result of exposure to environmental tobacco smoke. (*MMWR Morb Mortal Wkly Rep.* 2005;54:625-628.)

**Smokers are 2 to 4  
times more likely to develop  
CHD than nonsmokers.**

## Aftermath

- Data from *The Health Consequences of Involuntary Exposure to Tobacco Smoke: A Report of the Surgeon General (2006)*, indicate a 25–30 percent increase in risk of CHD from exposure to secondhand smoke.
- Information from the “CDC Health Effects of Cigarette Smoking Fact Sheet,” February 2004:
  - Cigarette smokers are two to four times more likely to develop CHD than nonsmokers.
  - Cigarette smoking approximately doubles a person’s risk for stroke.
  - Cigarette smokers are more than 10 times as likely as nonsmokers to develop peripheral vascular disease.

## Cost

- Direct medical costs (\$75.5 billion) and lost productivity costs associated with smoking (\$92 billion) total an estimated \$167 billion in the United States each year. (*MWR Morb Mortal Wkly Rep.* 2005;54[25]:625-628.)

## High Blood Cholesterol and Other Lipids

### Prevalence

#### Youth

- Among children and adolescents ages 4–19 (*NHANES III [1988–94]*):
  - Females have significantly higher average total cholesterol and LDL cholesterol (bad cholesterol) than males.
  - Non-Hispanic black children and adolescents have significantly higher mean total cholesterol, LDL cholesterol and HDL (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]*):
  - 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.
- About 10 percent of adolescents ages 12–19 have total cholesterol levels exceeding 200 mg/dL. (*NHANES III [1988–94]*)

#### Adults

- The 2004 estimated prevalence of total cholesterol (in adults age 20 and older) at or above 200 mg/dL was 105,200,000 (50,100,000 males; 55,200,000 females).
- A 10 percent decrease in total cholesterol levels (population-wide) may result in an estimated 30 percent reduction in the incidence of CHD. (*MMWR Morb Mortal Wkly Rep.* 2000;49[33]:750-755.)
- 2005 data from the BRFSS survey showed that overall, 35.6 percent of adults age 18 and older had



been told that they had high blood cholesterol. The highest percentage was in West Virginia (39.9 percent) and the lowest was in Louisiana (30.3 percent). (*www.cdc.gov/brfssl*)

## Adherence

Based on data from the Third Report of the Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults: (*Circulation*. 2002;106:3143-3421.)

- Less than half of persons who qualify for any kind of lipid-modifying treatment for CHD risk reduction are receiving it.
- Less than half of even the highest-risk persons, those with symptomatic CHD, are receiving lipid-lowering treatment.
- Only about a third of treated patients are achieving their LDL goal; less than 20 percent of CHD patients are at their LDL goal.

## LDL (Bad) Cholesterol

### Youth

- Mean LDL cholesterol levels among children and adolescents ages 12–19 are (*NHANES III [1988–94], 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.

**More than 105 million American adults have total blood cholesterol at or above 200 mg/dL.**

### Adults

- The 2004 estimated prevalence (in adults age 20 and older) of LDL cholesterol 130 mg/dL or higher was 79,300,000 (40,800,000 males; 38,600,000 females). The mean level of LDL cholesterol for American adults, age 20 and older, is 123 mg/dL. Levels of 130–159 mg/dL are considered borderline high. Levels of 160–189 mg/dL are classified as high, and levels of 190 mg/dL and higher are very high. (*JAMA*. 2005;294:1773-1781.)
- According to NHANES 1999–2002 (NCHS):
  - Among non-Hispanic whites, the mean LDL cholesterol level was 126 mg/dL for men and 121 mg/dL for women.

- Among non-Hispanic blacks, the mean LDL cholesterol level was 121 mg/dL for both men and women.
- Among Mexican Americans, the mean LDL cholesterol level was 125 mg/dL for men and 117 mg/dL for women.

## HDL (Good) Cholesterol

The higher a person's HDL cholesterol level is the better. A level of less than 40 mg/dL in adults is considered low HDL cholesterol, which is a risk factor for heart disease and stroke.

### Youth

- Mean HDL cholesterol levels among children and adolescents ages 4–19 are (*NHANES III [1988–94]*):
  - 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.

### Adults

- The 2004 estimated prevalence (in adults age 20 and older) of HDL cholesterol less than 40 mg/dL was 44,100,000 (31,700,000 males; 12,300,000 females).
- The mean level of HDL cholesterol for American adults age 20 and older is 51.3 mg/dL. (*JAMA*. 2005;294:1773-1781.)
- According to NHANES 1999–2002 (NCHS):
  - Among non-Hispanic whites, the mean HDL cholesterol level was 45.5 mg/dL for men and 52.9 for women.
  - Among non-Hispanic blacks, the mean HDL cholesterol level was 51.0 mg/dL for men and 57.3 for women.
  - Among Mexican Americans, the mean HDL cholesterol level was 45.0 mg/dL for men and 52.9 for women.

# Overweight and Obesity

## Prevalence

### Youth

- Over 9 million children and adolescents ages 6–19 are considered overweight, based on the 2000 CDC growth chart for the United States. (*NHANES [2003–04], NCHS*).
- Based on data from NHANES, the prevalence of overweight in children ages 6–11 increased from 4.0 percent in 1971–74 to 17.5 percent in 2001–04. The prevalence of overweight in adolescents ages 12–19 increased from 6.1 percent to 17.0 percent. (*Health, United States, 2006, NCHS*.)
- Nearly 14 percent of preschool children ages 2–5 were overweight in 2003–04, up from 10.3 percent in 1999–2000. (*JAMA. 2006;295:1549-1555.*)
  - Among preschool children, the following are overweight: 11.5 percent of non-Hispanic whites, 13.0 percent of non-Hispanic blacks and 19.2 percent of Mexican Americans.
  - Among children ages 6–11, the following are overweight: 17.7 percent of non-Hispanic whites, 22.0 percent of non-Hispanic blacks and 22.5 percent of Mexican Americans.
  - Among adolescents ages 12–19, the following are overweight: 17.3 percent of non-Hispanic whites, 21.8 percent of non-Hispanic blacks and 16.3 percent of Mexican Americans.
  - In addition, the data show that another 16.5 percent of children and teens ages 2–19 are considered at risk of being overweight (BMI from the 85th–95th percentile).
- Overweight adolescents have a 70 percent chance of becoming overweight adults. This increases to 80 percent if one or both parents are overweight or obese. ([www.surgeongeneral.gov/topics/obesity/calltoaction/fact\\_adolescents.htm](http://www.surgeongeneral.gov/topics/obesity/calltoaction/fact_adolescents.htm))
- Data from the CDC's YRBS 2005 survey showed that the prevalence of being overweight was higher among non-Hispanic black (16.0 percent) and Hispanic (16.8 percent) than non-Hispanic white (11.8 percent) students; higher among non-Hispanic black female (16.1 percent) and Hispanic female (12.1 percent) than non-Hispanic white female (8.2 percent) students; and higher among non-Hispanic black male (15.9 percent) and Hispanic male (21.3 percent) than non-Hispanic white male (15.2 percent) students. (*CDC. YRBS Survey 2005.*)

### Adults

- In 2004, an estimated 140,000,000 U.S. adults (age 20 and older) were overweight and 66,000,000 were obese.
- The age-adjusted prevalence of overweight and obesity (BMI of 25 or higher) increased from 64.5 percent in 1999–2000 (NHANES) to 66.3 percent in 2003–04 (NHANES). The prevalence of obesity (BMI of 30 or higher) increased during this period from 30.5 percent to 32.2 percent. Extreme obesity (BMI of 40.0 or higher) increased from 4.7 percent to 4.8 percent. (*JAMA. 2006;295:1549-1555.*)
- According to 2005 data from the BRFSS survey based on self-reported height and weight, 24.4 percent of adults are obese. By state, the highest prevalences of obesity were seen in Louisiana, Mississippi and West Virginia. The lowest prevalences were seen in Colorado and Hawaii. (<http://apps.nccd.cdc.gov/brfss/index.asp>)
- Data from the 1999–2003 NHIS study of the NCHS showed that American Indian or Alaska Native (AIAN) women age 18 and older were less likely (29.4 percent) than black women (36.6 percent) and more likely than white women (20.3 percent) and Asian women (5.8 percent) to be obese. (*Advance data from vital and health statistics; no. 356. 2005.*)
- According to the WHO, the number of overweight and obese people worldwide is set to increase to 1.5 billion by 2015 if current trends continue. Excessive weight and obesity are major risk factors for CVD, the No. 1 cause of death worldwide, claiming more than 17 million lives a year. ([www.who.int/mediacentre/news/release/2005](http://www.who.int/mediacentre/news/release/2005))
- Based on data from NHANES 2001–02 (NCHS), racial disparities in weight were observed among women, not among men; 68.6 percent of black women were overweight or obese compared to 56.0 percent of white women and 54.5 percent of Hispanic women. The racial differences among women were more pronounced when comparing the rates of obesity: 41.5 percent of black women were obese compared to 19.3 percent of white women and 26.2 percent of Hispanic women. (*J Natl Med Assoc. 2006;98:1300-1308.*)

## Cost

- The estimated annual cost of overweight and obesity, in 2001 dollars, is \$117 billion. Direct cost is \$61 billion and indirect cost is \$56 billion. The cost of lost productivity related to obesity among Americans ages 17–64 is \$3.9 billion. ([www.win.niddk.nih.gov/statistics/](http://www.win.niddk.nih.gov/statistics/))

# Diabetes Mellitus

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

## Prevalence

- The 2004 estimated prevalence (among adults age 18 and older) of physician-diagnosed diabetes was 15,200,000 (7,300,000 males; 7,900,000 females). The prevalence of undiagnosed diabetes was 5,000,000 (2,900,000 males; 2,100,000 females).
- An estimated 20.8 million Americans (7 percent of the population) have diabetes and about 30 percent are unaware of the diagnosis. (<http://diabetes.niddk.nih.gov/dml/pubs/statistics/index.htm#7>; accessed July 14, 2006)
- About 176,500 people age 20 or younger have diabetes (0.22 percent of all people in this age group). (<http://diabetes.niddk.nih.gov/dml/pubs/statistics/index.htm#7>; accessed July 14, 2006)
- From 1994–2002, the age-adjusted prevalence of diabetes increased by 54.0 percent for U.S. adults (from 4.8 percent to 7.3 percent), and increased 33.2 percent (from 11.5 percent to 15.3 percent) among American Indian or Alaska Native adults. The overall age-adjusted prevalence for American Indian or Alaska Native adults was more than twice that of U.S. adults overall. (*MMWR Morb Mortal Wkly Rep.* 2003;52:702-704.)
- Data from NHANES 1999–2002 showed a disproportionately high prevalence of diabetes in non-Hispanic blacks and Mexican Americans when compared to non-Hispanic whites. For previously diagnosed diabetes, the percentage was 11.0 for non-Hispanic blacks and 10.4 for Mexican Americans compared to 5.2 for non-Hispanic whites. (*MMWR Morb Mortal Wkly Rep.* 2003;52:833-837.)
- BRFSS 1998–2002 data showed that diabetes disproportionately affects Hispanics in the United States and Puerto Rico. Hispanics were twice as likely to have diabetes as non-Hispanic whites of similar age (9.8 percent versus 5.0 percent). This disparity, however, varied by geographic location; it was lowest in Florida and higher in California, Texas and Puerto Rico. (*MMWR Morb Mortal Wkly Rep.* 2004;53:941-944.)
- The prevalence of diabetes for all age groups, worldwide, was estimated to be 2.8 percent in 2000 and a projected 4.4 percent in 2030. The total number of people with diabetes is projected to rise from 171 million in 2000 to 366 million in 2030. (*Diabetes Care.* 2004;27:1047-1053.)

- Type 2 diabetes may account for 90–95 percent of all diagnosed cases of diabetes. ([diabetes.niddk.nih.gov/dml/pubs/statistics/index.htm](http://diabetes.niddk.nih.gov/dml/pubs/statistics/index.htm))

## Incidence

- 1.5 million new cases of diabetes were diagnosed in people age 20 or older in 2005. (<http://diabetes.niddk.nih.gov/dml/pubs/statistics/index.htm#7>; accessed July 14, 2006)
- Data from Framingham, Massachusetts, indicate a doubling in the incidence of diabetes over the past 30 years, and most dramatically during the 1990s. (*Circulation.* 2006;113:2914-2918.)

## Mortality

Diabetes mortality in 2004—72,815.

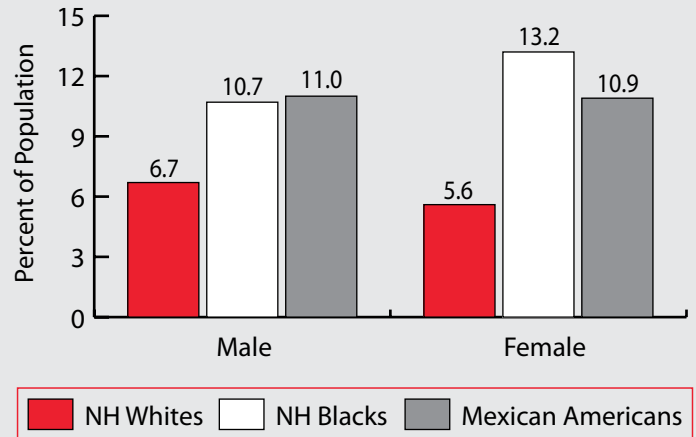
- The 2004 overall death rate from diabetes was 24.4. Death rates were 26.1 for white males, 50.5 for black males, 19.2 for white females and 44.9 for black females.
- At least 65 percent of people with diabetes mellitus die of some form of heart disease or stroke. (*Centers for Disease Control and Prevention. Diabetes Surveillance Report, 1999.*)
- Heart disease death rates among adults with diabetes are two to four times higher than the rates for adults without diabetes. ([diabetes.niddk.nih.gov](http://diabetes.niddk.nih.gov))

## Aftermath

- Diabetes increases the risk of stroke, with the relative risk ranging from 1.8 to almost 6.0. (*Stroke.* 2001;32:280-299.)
- Ischemic stroke patients with diabetes are younger, more likely to be African American and more likely to have hypertension, myocardial infarction and high cholesterol than nondiabetic patients. Diabetes increases ischemic stroke incidence at all ages, but this risk is most prominent before age 55 in African Americans and before age 65 in whites. (*Diabetes Care.* 2005;28:355-359.)
- Based on data from the CDC Diabetes Surveillance System, 1997–2000:
  - In 2000, the prevalence of any self-reported cardiovascular condition among persons with diabetes age 35 and older was 37.5 percent for white men, 32.2 percent for white women, 31.4 percent for black men, 34.0 percent for black women, 23.9 percent for Hispanic men and 22.9 percent for Hispanic women.

- In 2000, among persons with diabetes age 35 and older, 37.2 percent reported being diagnosed with a cardiovascular condition.
- In 2000, 4.4 million persons age 35 and older with diabetes reported being diagnosed with a cardiovascular condition, 2.9 million were diagnosed with CHD and 1.1 million reported being diagnosed with a stroke.
- New York City death certificate data for 1989–91 and 1999–2001 and hospital discharge data for 1988–2002 show alarming increases in mortality and annual hospitalization rates for diabetes and its complications among patients hospitalized with acute myocardial infarction and/or diabetes. During this decade, all-cause and cause-specific mortality rates declined, with the striking exception of diabetes, which increased 61 percent and 52 percent for men and women, respectively, as did hospitalization rates for diabetes and its complications. These data suggest that increases in diabetes rates threaten the long-established nationwide trend towards reduced coronary artery events. (*Diabetes. 2006;55:768-773.*)

**Prevalence of Physician-Diagnosed Diabetes in Adults Age 20 and Older by Race/Ethnicity and Sex**  
NHANES: 1999-2004



Source: NCHS and NHLBI. NH = non-Hispanic

For more statistics on diabetes,  
please visit our Web site at  
[www.americanheart.org/statistics](http://www.americanheart.org/statistics).



- The term “metabolic syndrome” refers to the clustering of risk factors for cardiovascular disease (CVD) and type 2 diabetes. There are several different definitions for metabolic syndrome (MetS) in use; in the United States, the NCEP ATP3 definition is most commonly used. By these criteria, MetS is diagnosed when three or more of the following five risk factors are present: (*Circulation. 2005;112;2375-2752.*)
  - Fasting plasma glucose of 100 mg/dL or higher
  - HDL cholesterol below 40 mg/dL in men or below 50 mg/dL in women
  - Triglycerides of 150 mg/dL or higher
  - Waist circumference of 102 cm or higher in men or 88 cm or higher in women
  - Systolic blood pressure of 130 mm Hg or higher, or diastolic pressure of 85 mm Hg or higher, or drug treatment for hypertension
- Among more than 3,400 children examined in one study, one in 10 had MetS. (*Circulation. 2003;108:IV-727. Abstract 3286.*)
- Using a sample of adolescents from NHANES III, the overall prevalence of MetS was 38.7 percent in moderately obese subjects and 49.7 percent in severely obese subjects. The prevalence of MetS in severely obese black subjects was 39 percent. (*N Engl J Med. 2004;350:2362-2374.*)
- People with MetS are at increased risk for developing diabetes and CVD as well as increased mortality from CVD and all causes.
- According to NHANES data, people with MetS had a higher risk for coronary heart disease (CHD) mortality, CVD mortality and all-cause mortality than people with no metabolic disorder, but a lower risk than people with diabetes.
- In the ARIC study of 12,089 black and white middle-aged individuals, over an average of 11 years of follow-up, men and women with MetS were approximately 1.5 and two times more likely to develop CHD after adjustment for age, smoking, LDL cholesterol, and race. Among the components of MetS, elevated blood cholesterol and low levels of HDL cholesterol were most strongly associated with CHD. Similar associations were found between MetS and stroke. (*Diabetes Care. 2005;28:385-390.*)
- Population-based data from the United Kingdom showed that men with MetS at baseline (26 percent) had a significantly higher relative risk of developing CHD, stroke, and diabetes than men without MetS. The probability of developing CVD or diabetes over 20 years increased from 11.9 percent in those with no MetS risk factors to 31.2 percent in those with three risk factors to 40.8 percent in those with four or five risk factors. (*Arch Intern Med. 2005;165:2644-2650; Diabetes Care. 2004;27:2676-2681.*)

Based on NCEP ATP3 criteria:

- An estimated 47 million U.S. residents have MetS. (*JAMA. 2002;287:356-359.*)
- The age-adjusted prevalence of MetS for adults is 23.7 percent. (*JAMA. 2002;287:356-359.*)
  - The prevalence ranges from 6.7 percent among people ages 20–29 to 43.5 percent for ages 60–69 and 42.0 percent for those age 70 and older.
  - The age-adjusted prevalence is similar for men (24.0 percent) and women (23.4 percent).
  - Mexican Americans have the highest age-adjusted prevalence of MetS (31.9 percent). The lowest prevalence is among whites (23.8 percent), African Americans (21.6 percent) and people reporting as “other” race or ethnicity (20.3 percent).
  - Among African Americans, women had about a 57 percent higher prevalence than men. Among Mexican Americans, women had a 26 percent higher prevalence than men.
- An estimated 1 million 12–19-year-old adolescents in the United States have MetS, or 4.2 percent overall (6.1 percent of males and 2.1 percent of females). Of adolescents with MetS, 73.9 percent are overweight and 25.2 percent were at risk of overweight. (*Circulation 2003;108:IV-727. Abstract 3286.*)

## Caloric Consumption

- The Economic Research Service of the USDA suggests that the average daily calorie consumption in the United States increased 16 percent between 1970 and 2003, or by 523 calories. Of that increase, grains (mainly refined grains) accounted for 43 percent; fats and oils, 63 percent; sugars and sweeteners, 19 percent; fruits, 12 percent; vegetables, 24 percent; meat, eggs and nuts, 7 percent; and dairy groups, 5 percent. (<http://www.ers.usda.gov/AmberWaves/November05/Findings/USFoodConsumption.htm>)
- Between 1971–74 and 1999–2000, age-adjusted total daily calories for people ages 20–74 increased from 2,450 to 2,618 for men and from 1,542 to 1,877 for women. (*Annu Rev Nutr.* 2004;24:401-31.)
- Between 1977 and 1996, portion sizes for key food groups grew markedly in the United States, not only at fast-food outlets but also in homes and at conventional restaurants. One study of portion sizes for typical items showed that:
  - Salty snacks increased from 132 calories to 225 calories.
  - Soft drinks increased from 144 calories to 193 calories.
  - French fries increased from 188 calories to 256 calories.
  - Hamburgers increased from 389 calories to 486 calories. (*JAMA.* 2003;289:450-453.)

## Fat Consumption

- The average daily intake of total fat in the United States is 79 grams (g) (91 g for males and 67 g for females). (*NHANES 1999–2000*)
  - The average daily intake of saturated fat in the United States is 27 g (31 g for males and 23 g for females).
- Data from NHANES 1999–2000 (NCHS) showed the mean percent of calories from total fat was 32.7 percent for both sexes; 32.7 percent for males and 32.6 percent for females. (*Advance data from vital and health statistics; no. 334. 2003.*)
- Data from NHANES 1999–2000 (NCHS) showed the mean percent of calories from saturated fat

was 11.2 percent for both sexes; 11.2 percent for males and 11.1 percent for females. (*Advance data from vital and health statistics; no. 334. 2003.*)

## Fiber

- The recommended daily intake of dietary fiber is 25 g or more. Americans consume a daily average of 15.6 g of dietary fiber (17.8 g for males and 13.6 g for females). (*NHANES III [1988–94]*)

## Fruits/Vegetables

- In 2005, 76.8 percent of adults age 18 and older reported eating fewer than five servings of fruits and vegetables a day. ([www.cdc.gov/brfssl](http://www.cdc.gov/brfssl))
- The highest proportion of adults who consume fruits and vegetables at least five times a day are those age 65 and older, whites, college graduates, those who actively participate in leisure-time physical activity, and nonsmokers. (*Prev Med.* 2001;32:245-254.)
- The percentage of males who consumed fruits and vegetables at least five times a day was 17.7 in 2003. For females, the percentage was 27.0. (*BRFSS 2003, CDC*)
- In 2005, the percentage of students in grades 9–12 who reported eating fruits and vegetables five or more times per day was 21.4 percent for males and 18.7 percent for females.
  - Black students (22.1 percent) and Hispanic students (23.2 percent) were more likely than non-Hispanic white (18.6 percent) students to have eaten five or more servings per day. This percentage was higher among Hispanic female students (21.8 percent) than white female (17.4 percent) students; and higher among black male (24.3 percent) and Hispanic male (24.5 percent) than white male (19.7 percent) students. (*MMWR Morb Mortal Wkly Rep.* 2006;55[SS-5].)

## Cost

Each year over \$33 billion in medical costs and \$9 billion in lost productivity due to heart disease, cancer, stroke and diabetes are attributed to poor nutrition. ([www.cdc.gov/nccdphp](http://www.cdc.gov/nccdphp))

## American Heart Association GWTG–CAD Program

Get With The Guidelines<sup>SM</sup> (GWTG) – Coronary Artery Disease (CAD) is an American Heart Association program to improve quality of care. Participating hospitals are involved in initiatives to increase adherence to key quality-of-care indicators in patients admitted with a cardiovascular event. The table below summarizes performance on the selected indicators. These were collected from 74,143 patients who were admitted to 376 hospitals participating in the GWTG–CAD program from Jan. 1, 2005–Dec. 31, 2005.

Performance indicator	Percent of inpatients
Aspirin within 24 hours of admission	94.6
Aspirin at discharge*	94.2
Beta blocker at discharge*	90.5
ACE inhibitor at discharge	66.0
ACE inhibitor at discharge for AMI patients*	68.2
ACE inhibitor in LVSD patients	79.2
Lipid therapy at discharge	72.1
Lipid therapy at discharge if LDL >100 mg/dL*	78.1
Blood pressure control (to <140/90) at discharge	78.8
Smoking cessation counseling*	90.0
Referral to cardiac rehabilitation	70.3
Composite quality of care measure**	86.3

\* Indicates the 5 key performance measures targeted in GWTG–CAD.

\*\* The composite quality of care measure indicates performance on the provision of several elements of care. It is computed by summing the numerators for each key performance measure across the population of interest to create a composite numerator (all the care that was given), summing the denominators for each measure to form a composite denominator (all the care that should have been given), and reporting the ratio (the percentage of all the needed care that was given).

## American Heart Association/ American Stroke Association GWTG–Stroke Program

Get With The Guidelines<sup>SM</sup> (GWTG) – Stroke is an American Heart Association/American Stroke Association program to improve quality of care. Participating hospitals are involved in initiatives to increase adherence to key quality-of-care indicators in patients admitted with an ischemic stroke or transient

ischemic attack. The table below summarizes performance on the selected indicators for acute stroke and secondary prevention. There were 93,722 clinically identified patients who were admitted to 587 hospitals participating in GWTG–Stroke from Jan. 1, 2005–Dec. 31, 2005

Performance indicator	Percent of inpatients
IV tPA in patients who arrived <2 hr after symptom onset*	55.8
IV tPA in patients who arrived <3 hr after symptom onset	46.1
Documentation of ineligibility (why no tPA)	89.3
Rate of symptomatic brain hemorrhage after tPA**	5.6
Antithrombotics <48 hr after admission*	93.9
DVT prophylaxis by second hospital day*	79.8
Antithrombotics at discharge*	97.3
Anticoagulation for atrial fibrillation at discharge*	97.3
Therapy at discharge if LDL >100 mg/dL or on therapy at admit*	78.6
Counseling for smoking cessation*	75.9
Lifestyle changes recommended for BMI >25 kg/m <sup>2</sup>	38.0
Composite quality of care measure	88.0

\* Indicates the seven key performance measures targeted in GWTG–Stroke.

\*\* A smaller denominator for IV and tPA measures in the study population.

## American Heart Association GWTG–HF Program

Get With The Guidelines<sup>SM</sup> (GWTG) – Heart Failure (HF) is an American Heart Association program to improve quality of care. Participating hospitals are involved in initiatives to increase adherence to key quality-of-care indicators in patients admitted with heart failure. The table on the following page summarizes performance on the selected indicators. These were collected from 17,941 patients who were admitted to 144 hospitals participating in GWTG–HF from Jan. 1, 2005–Dec. 31, 2005.

Performance indicators	Percent of inpatients
Complete set of discharge instructions*	71.9
Measure of LV function*	90.0
ACE or ARB at discharge for patients with LVSD, no contraindications*	81.2
Smoking cessation counseling, current smokers*	79.2
Beta blockers at discharge for patients with LVSD, no contraindications*	85.9
Anticoagulation for atrial fibrillation or atrial flutter, no contraindications	62.7
Composite quality of care measure	82.5

\* Indicates the five key performance measures targeted in GWTG–HF.

## National Medicare and Medicaid Data

As part of the Hospital Quality Alliance Program, data are collected by the Centers for Medicare and Medicaid Services on quality-of-care indicators for conditions including acute myocardial infarction and heart failure. The data were collected from eligible patients for hospital admissions between July 2004 and June 2005 and summarized as follows:

Acute myocardial infarction	Percent of inpatients
Aspirin at arrival	94.7
Beta blocker at arrival	90.8
Thrombolytic therapy within 30 minutes of hospital arrival	38.0
PCI within 120 minutes of hospital arrival	65.9
Smoking cessation advice/counseling	88.6
Aspirin at discharge	94.9
Beta blocker at discharge	93.5
ACE inhibitor or ARB for LV dysfunction at discharge	82.4

Heart failure	Percent of inpatients
Assessment of LV function	88.4
ACE inhibitor or ARB for LV dysfunction at discharge	81.7
Smoking cessation advice/counseling	77.2
Discharge instructions	54.2

\* Data obtained from United States Department of Health & Human Services Hospital Compare Web site: <http://www.hospitalcompare.hhs.gov/hospital/home2.asp>.

## National Veterans Health Administration Data

The VA collects national quality performance data related to cardiovascular disease. Aggregate data from 158 VA hospitals for January 2005–December 2005 are listed in the table below (Office of Quality and Performance, Veterans Health Administration). Only patients who were candidates for each quality indicator were considered (i.e., patients with contraindications to a given therapy were not considered).

Acute myocardial infarction	Percent of inpatients
Aspirin within 24 hours of admission	97
Aspirin at discharge	98
Beta blocker within 24 hours of admission	96
Beta blocker at discharge	99
ARB/ACE inhibitor for patients with LVEF <40%	89
Smoking cessation advice given	95

Heart failure	Percent of inpatients
Documentation of LVEF	98
ARB/ACE inhibitor for patients with LVEF <40%	87
Complete discharge instructions	98
Smoking cessation advice given	92

Hypertension	Percent of inpatients
Blood pressure at goal (<140/90)	74

Cholesterol	Percent of outpatients
Cholesterol screening in all patients	94
Cholesterol measured after acute MI	95
LDL cholesterol <100 mg/dL after acute MI	66

For more statistics on quality of care, please visit our Web site at [www.americanheart.org/statistics](http://www.americanheart.org/statistics).



## Total Procedures

- From 1979–2004, the total number of inpatient cardiovascular operations and procedures increased 432 percent. (*AHA computation based on annual National Hospital Discharge Survey data.*)

## Cardiac Catheterization

- From 1979–2004, the number of cardiac catheterizations increased 334 percent. (*AHA computation.*)
- An estimated 1,297,000 inpatient cardiac catheterizations were performed in 2004.
- The mean charge for patients hospitalized for diagnostic cardiac catheterization increased from \$11,611 in 1993 to \$24,893 in 2003. The total number of patients increased from 628,962 to 728,786, while the average length of stay decreased from 4.9 days to 3.7 days. (*Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, HCUPnet, hcup.ahrq.gov.*)

## Coronary Artery Bypass Surgery

In the United States in 2004 (according to NCHS estimates), 427,000 of these procedures were performed on 249,000 patients.

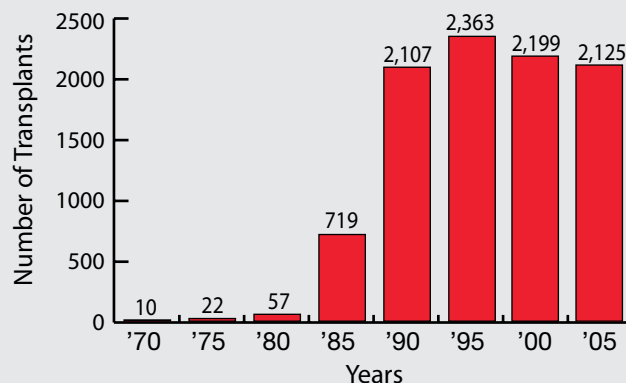
- Compared with Canadian patients, U.S. patients were older, more likely to be female, and discharged from the hospital sooner. After controlling for demographic and clinical differences, length of stay in Canada was 16.8 percent longer than in the United States; there was no difference in in-hospital mortality; and the cost in the United States was 82.5 percent higher than in Canada. (*Arch Intern Med. 2005;165:1506-1513.*)

## Heart Transplants

In 2005, 2,125 heart transplants were performed in the United States. There are 309 organ transplant centers in the United States, 186 of which perform heart transplants. (<http://www.unos.org/>)

### Trends in Heart Transplants

UNOS: 1970–2005



Source: United Network for Organ Sharing (UNOS), scientific registry data.

- In the United States, 72.4 percent of heart transplant patients are male, 70.0 percent are white, 19.1 percent are ages 35–49, and 45.0 percent are ages 50–64.
- As of Aug. 11, 2006, the one-year survival rate for males was 86.1 percent and for females it was 83.9 percent; the three-year rate was 78.3 percent for males and 74.9 percent for females, and the five-year rate was 71.2 percent for males and 66.9 percent for females.
- As of Aug. 11, 2006, there were 2,871 heart patients on the transplant waiting list.

## Percutaneous Coronary Intervention

(PCI, previously referred to as PTCA)

- An estimated 664,000 PCI procedures were performed on 658,000 patients in 2004 in the United States. From 1987–2004, the number of procedures increased 326 percent. (*AHA computation.*)
- In 2004, 66.5 percent of PCI procedures were performed on men and 52 percent were performed on people age 65 and older.
- The rate of coronary stent insertion increased 147 percent between 1996 and 2000. (*Health Care in America: Trends in Utilization. Hyattsville, MD.: NCHS. 2003.*)

## Estimated\* Inpatient Cardiovascular Operations, Procedures and Patient Data by Sex, Age and Region

United States: 2004 (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	1,285	853	432	—	72	550	663	227	333	634	350
PCI (36.01, .02, .05) (a)	Procedures	664	448	226	—	35	284	342	118	167	242	128
	Patients (f)	658	435	223	—	36	282	339	118	168	240	132
Stenting (36.06, 36.07)	Procedures	615	412	203	—	35	264	316	105	163	219	129
Cardiac Revascularization (Bypass) (36.1-36.3) (b)	Procedures	427	303	124	—	17	195	215	81	89	170	87
	Patients	249	174	76	—	9	111	129	47	52	100	50
Diagnostic Cardiac Catheterizations (37.2) (a)	Procedures	1,297	771	526	11	101	547	638	268	89	170	87
Endarterectomy (38.12)	Procedures	98	60	38	—	—	19	78	19	21	43	15
Implantable Defibrillators (37.94-.99)	Procedures	68	48	20	—	—	—	—	—	—	—	—
Open-Heart Surgery (c)	Procedures	646	426	223	33	41	256	329	158	129	242	135
Pacemakers (37.7-.8) (d)	Procedures	170	85	85	—	—	22	144	51	29	59	31
Valves (35.1, .2, .99) (e)	Procedures	99	52	47	—	10	25	58	25	17	33	20
<b>Total Vascular and Cardiac Surgery and Procedures (35-39)**</b>		<b>6,993</b>	<b>3,985</b>	<b>3,009</b>	<b>226</b>	<b>675</b>	<b>2,511</b>	<b>3,581</b>	<b>1,388</b>	<b>1,440</b>	<b>2,731</b>	<b>1,434</b>

Note: (—) = data not available. (160, 210, 111) 2004 data for NA for regions.

\* 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 non-hospitalized setting; thus, excludes some cardiac catheterizations and PCIs.

(b) — Because one or more procedure codes are required to describe the specific bypass procedure performed, it's impossible from this (mixed) data to determine the average number of grafts per patient.

(c) — Includes valves, bypass and 104,000 "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.

(e) — Open heart valvuloplasty without replacement; replacement of heart valve; other operations on heart valves.

(f) — Data are for patients with a PCI listed anywhere on their medical record, but patients with a PCI listed were only counted once, even if they also had a code for insertion of stent. In 2003, 84% of patients with PCI were reported to have a stent inserted.

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

Note: These data do not reflect any procedures performed on an outpatient basis. Many more procedures are being performed on an outpatient basis. Some of the lower numbers in the table probably reflect this trend. Outpatient procedure data are not available at this time.

References: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, HCUPnet, [hcup.ahrq.gov](http://hcup.ahrq.gov).

Eisenberg MJ, Filion KB, Azoulay A, Brox AC, Haider S, Pilote L. Outcomes and cost of coronary artery bypass graft surgery in the United States and Canada. *Arch Intern Med.* 2005;165:1506-1513.

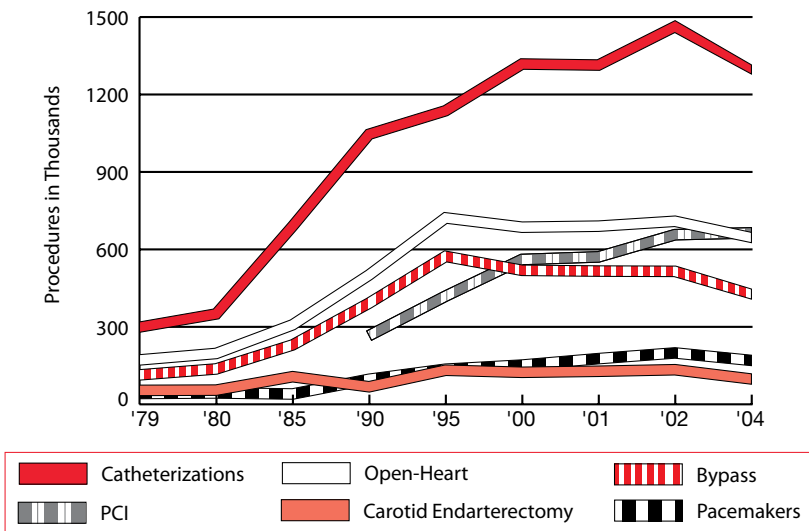
Bernstein AB, Hing E, Moss AL, Allen KS, Siller AB, Tiggle RB. *Health Care in America: Trends in Utilization.* Hyattsville, Md.: NCHS. 2003.

Centers for Disease Control and Prevention (CDC). Quick Stats, "use of stents among hospitalized patients undergoing coronary angioplasty, by race, United States, 2003. *MMWR* 2005;54(12):310.

Jha AK, Fisher ES, Li Z, Orav EJ, Epstein AM. Racial trends in the use of major procedures among the elderly. *N Engl J Med* 2005;353:681-691.

### Trends in Cardiovascular Operations and Procedures

United States: 1979-2004

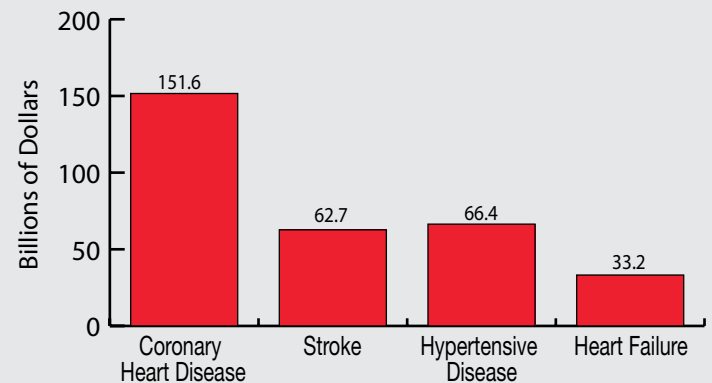


Source: NHDS, NCHS AND NHLBI. Note: In-hospital procedures only.

# Economic Cost of Cardiovascular Diseases

The cost of cardiovascular diseases and stroke in the United States for 2007 is estimated at \$431.8 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 2004 the estimated cost of all cancers was \$190 billion (\$69 billion in direct costs, \$17 billion in morbidity indirect costs and \$104 billion in mortality indirect costs).

**Estimated Direct and Indirect Costs (in Billions of Dollars) of Major Cardiovascular Diseases and Stroke United States: 2007**



Source: NHLBI.

## Estimated Direct and Indirect Costs (in Billions of Dollars) of Cardiovascular Diseases and Stroke

United States: 2007

	Heart Diseases**	Coronary Heart Disease	Stroke	Hypertensive Disease	Heart Failure	Total Cardiovascular Disease*
<b>Direct Costs</b>						
Hospital	\$94.2	\$48.4	\$17.9	\$7.2	\$17.8	\$133.0
Nursing home	\$22.0	\$11.6	\$15.2	\$4.5	\$4.2	\$45.3
Physicians/other professionals	\$22.2	\$12.5	\$3.5	\$12.5	\$2.3	\$43.3
Drugs/other						
Medical durables	\$20.0	\$9.2	\$1.2	\$23.0	\$3.0	\$47.2
Home health care	\$6.4	\$1.9	\$3.8	\$2.1	\$2.9	\$14.4
<b>Total expenditures*</b>	<b>\$164.9</b>	<b>\$83.6</b>	<b>\$41.6</b>	<b>\$49.3</b>	<b>\$30.2</b>	<b>\$283.2</b>
<b>Indirect Costs</b>						
Lost productivity/morbidity	\$22.3	\$9.8	\$6.5	\$7.8	N/A	\$36.3
Lost productivity/mortality#	\$89.9	\$58.2	\$14.6	\$9.3	\$3.0	\$112.3
<b>Grand totals*</b>	<b>\$277.1</b>	<b>\$151.6</b>	<b>\$62.7</b>	<b>\$66.4</b>	<b>\$33.2</b>	<b>\$431.8</b>

Note: N/A = data not available.

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

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

# Lost future earnings of persons who will die in 2007, discounted at 3 percent.

Sources: Direct costs: Extrapolation from 1995 cost estimates for cardiovascular diseases in Hodgson and Cohen<sup>1</sup> to the 2007 national health expenditure projections by the Centers for Medicare and Medicaid Services<sup>2</sup>; Indirect morbidity costs extrapolated to 2007 from indirect cost estimates by disease in 1980 by Rice, Hodgson, and Kopstein<sup>3</sup> after applying a 1980–2007 inflation factor<sup>4</sup>; Indirect mortality costs estimated by multiplying the numbers of deaths by age, sex, and cause in 2003<sup>5</sup> (NCHS mortality statistics) times estimates of the present value of lifetime earnings for 2002 by age and sex furnished by Rice, Max, Michel, and Sung<sup>6</sup> times the 2002–07 inflation factor<sup>4</sup>.

All estimates prepared by Thomas Thom, NHLBI.

References: 1. Hodgson TA, Cohen AJ. Medical care expenditures for selected circulatory diseases: opportunities for reducing national health expenditures. *Med Care*. 1999;37:994-1012.

2. Centers for Medicare and Medicaid Services; Office of the Actuary. National Health Care Expenditures Projections: 2009-215. Executive Summary. <http://www.cms.hhs.gov/NationalHealthExpendData/downloads/proj2005.pdf>.

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

4. US Bureau of the Census. Historical Income Tables – People: Table P37: Full-time, Year-Round, All Workers by Mean Income and Sex: 1955-2004. <http://www.census.gov/hhes/www/income/histinc/p37ar.html>.

5. Mortality Statistics Branch, NCHS. Deaths for 358 Selected Causes by 5-Year Age Groups, Race, and Sex, United States, 2003. Data Warehouse: <http://www.cdc.gov/nchs/dataawh/statab/unpubd/mortabs.htm>.

6. Rice, Max, Michel, and Sung. Institute for Health and Aging, University of California, San Francisco. Present Value of Lifetime Earnings, U.S., 2003. Unpublished tables for 2005 provided by Wendy Max, August 20, 2005.

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

**AHRQ** — Agency for Healthcare Research and Quality — A part of the U.S. Department of Health and Human Services, this is the lead agency charged with supporting research designed to improve the quality of health care, reduce its cost, improve patient safety, decrease medical errors, and broaden access to essential services. AHRQ sponsors and conducts research that provides evidence-based information on healthcare outcomes; quality; and cost, use, and access. The information helps healthcare decisionmakers — patients and clinicians, health system leaders, and policymakers — make more informed decisions and improve the quality of healthcare services.

**Bacterial Endocarditis** — An infection of the heart's inner lining (endocardium) or the heart valves. The bacteria that most often cause endocarditis are streptococci, staphylococci, and enterococci.

**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<sup>2</sup>).

**Centers for Disease Control and Prevention/National Center for Health Statistics (CDC/NCHS)** — An agency within the U.S. Department of Health and Human Services (USDHHS). The CDC conducts the:

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

The NCHS conducted the:

- *National Ambulatory Medical Care Survey (NAMCS)*.
- *National Health Examination Survey (NHES)*.
- *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)*.
- *National Health and Nutrition Examination Survey (NHANES, 1999–...)*

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

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

**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” 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 population. National death rates are computed per 100,000 population. Dividing the mortality by the population gives a crude death 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, rates calculated within specific subgroups, such as age-specific or sex-specific rates, are often more meaningful and informative. They allow well-defined subgroups of the total population to be examined.

**Diseases of the Circulatory System** — ICD codes (I00-I99); included as part of what the American Heart Association calls “Cardiovascular Disease.” Mortality data for states can be obtained from [cdc.gov/nchs](http://cdc.gov/nchs), by direct communication with the CDC/NCHS, or from our National Center Biostatistics Program Coordinator on request. (See “Total Cardiovascular Disease” in this Glossary.)

**Diseases of the Heart** — Classification the NCHS uses in compiling the leading causes of death. 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); heart failure (I50); and other forms of heart disease (I29-I49, I50.1-I51). “Diseases of the Heart” is not equivalent to “Total Cardiovascular Disease,” which the American Heart Association prefers to use to describe the leading causes of death. “Diseases of the Heart” represents about three-fourths of “Total Cardiovascular Disease” mortality.

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

**Hispanic Origin** — In U.S. government statistics, “Hispanic” includes persons who trace their ancestry to Mexico, Puerto Rico, Cuba, Spain, the Spanish-speaking countries of Central or South America, the Dominican Republic or other Spanish cultures, regardless of race. It doesn't include people from Brazil, Guyana, Suriname, Trinidad, Belize and Portugal because Spanish is not the first language in those countries. Much of our data are for Mexican Americans or Mexicans, as reported by government agencies or specific studies. In many cases, data for all Hispanics are more difficult to obtain.

**Hospital Discharges** — The number of inpatients discharged from short-stay hospitals where some type of disease was the first listed diagnosis. Discharges include those discharged alive, dead or under unknown status.

**ICD Codes** — A classification system in standard use in the United States. The “International Classification of Diseases” (ICD) is published by the World Health Organization. This system is reviewed and revised about every 10–20 years to ensure its continued



flexibility and feasibility. The tenth revision (ICD/10) began with the release of 1999 final mortality data. The ICD revisions can cause considerable change in the number of deaths reported for a given disease. The NCHS provides “comparability ratios” to compensate for the “shifting” of deaths from one ICD code to another. In this Update, the reported mortality is used for one year’s data. To compare the number or rate of deaths with that of an earlier year, the “comparability-modified” number or rate is used.

**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. The incidence of a specific disease is estimated by multiplying the incidence rates reported in community- or hospital-based studies by the U.S. population. **The rates in this report change only when new data are available; they are not computed annually.**

**Major Cardiovascular Diseases** — Disease classification commonly reported by the NCHS; represents ICD codes I00-I78. The American Heart Association doesn’t use “Major CVD” for any calculations. See “Total Cardiovascular Disease” in this Glossary.

**Metabolic Syndrome\*** — The metabolic syndrome is defined as having any three of the following five diagnostic measures: elevated waist circumference (>102 cm. in men or >88 cm. in women); elevated triglycerides (>150 mg/dL [1.7 mmol/L] or drug treatment for elevated triglycerides); reduced HDL (high density lipoprotein) cholesterol (<40 mg/dL [0.9 mmol/L] in men or <50 mg/dL [1.1 mmol/L] in women or drug treatment for reduced HDL cholesterol); elevated blood pressure (>130 mm Hg systolic blood pressure or >85 mm Hg diastolic blood pressure or drug treatment for hypertension); elevated fasting glucose (>100 mg/dL or drug treatment for elevated glucose). \*According to criteria established by the American Heart Association/National Heart, Lung, and Blood Institute, in “Diagnosis and Management of the Metabolic Syndrome: An American Heart Association/National Heart, Lung, and Blood Institute Scientific Statement,” published in *Circulation*. (2005, Vol. 112, pages 2735-2752)

**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. These data are compiled from death certificates and sent by state health agencies to the NCHS. The process of verifying and tabulating the data takes about two years. For example, 2004 mortality statistics, the latest available, didn’t become available until late 2005. Mortality is “hard” data, so it’s possible to do time-trend analysis and compute percentage changes over time.

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

The NHLBI also published reports of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure and the Third Report of the Expert Panel on Detection,

Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III, or ATP III.)

**National Institute of Neurological Disorders and Stroke (NINDS)** — An institute in the National Institutes of Health in the US Department of Health and Human Services. The NINDS sponsors and conducts research studies such as these:

- *Greater Cincinnati/Northern Kentucky Stroke Study (GCNKSS)*
- *Rochester (Minnesota) Stroke Epidemiology Project*
- *Northern Manhattan Stroke Study (NOMASS)*
- *Brain Attack Surveillance in Corpus Christi (BASIC) Project*

**Prevalence** — An estimate of the total number of cases of a disease existing in a population during a specified period. Prevalence is sometimes expressed as a percentage of population. Rates for specific diseases are calculated from periodic health examination surveys that government agencies conduct. Annual changes in prevalence as reported in this booklet only reflect changes in the population; rates do not change until there’s a new survey. Changes in rates can only be evaluated with data from new surveys. Estimates from NHANES 1999–2002 applied to 2004 population estimates.

**NOTE: In the data tables, which are located in the different disease and risk factor categories, if the percentages shown are age adjusted, they will not add to the total.**

**Race and Hispanic Origin** — Race and Hispanic origin are reported separately on death certificates. In this publication, unless otherwise specified, deaths of Hispanic origin are included in the totals for whites, blacks, American Indians or Alaska Natives and Asian or Pacific Islanders, according to the race listed on the decedent’s death certificate. Data for Hispanic persons include all persons of Hispanic origin of any race. See “Hispanic Origin” in this Glossary.

**Stroke (ICD/10 codes I60-I69)** — This category includes: subarachnoid hemorrhage (I60); intracerebral hemorrhage (I61); other nontraumatic intracranial hemorrhage (I62); cerebral infarction (I63); stroke, not specified as hemorrhage or infarction (I64); occlusion and stenosis of precerebral arteries not resulting in cerebral infarction (I65); occlusion and stenosis of cerebral arteries not resulting in cerebral infarction (I66); other cerebrovascular diseases (I67); cerebrovascular disorders in diseases classified elsewhere (I68), and sequelae of cerebrovascular disease (I69).

**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). When data are available, we include congenital cardiovascular defects (Q20-Q28).

**Total Mention Mortality** — Mortality data are grouped according to the underlying cause of death. “Total mention” mortality, however, includes deaths where the given cause was listed anywhere on the death certificate or was selected as the underlying cause. It is, therefore, useful to know the extent of mortality from a given cause whether it is the underlying cause or a contributing (secondary) cause, i.e., its “total mentions.”

# 16 Abbreviation Guide

ACE	angiotensin-converting enzyme	MACDP	Metropolitan Atlanta Congenital Defects Program
ACS	acute coronary syndrome	MetS	metabolic syndrome
ADHERE	Acute Decompensated HEart Failure National REgistry	mg/dL	milligrams per deciliter
AED	automated external defibrillator	MI	myocardial infarction
AF	atrial fibrillation	mm Hg	millimeters of mercury
AHA	American Heart Association	MMWR	Morbidity and Mortality Weekly Report
AHRQ	Agency for Healthcare Research and Quality	NAMCS	National Ambulatory Medical Care Survey
AIDS	acquired immune deficiency syndrome	NCEP	National Cholesterol Education Program
AJC	American Journal of Cardiology	NCHS	National Center for Health Statistics
AP	angina pectoris	NCQA	National Committee for Quality Assurance
ARIC	Atherosclerosis Risk in Communities	NEJM	New England Journal of Medicine
ATP	Adult Treatment Panel	NHAMCS	National Hospital Ambulatory Medical Care Survey
BMI	body mass index	NHANES	National Health and Nutrition Examination Survey
BP	blood pressure	NHDS	National Hospital Discharge Survey
BRFSS	Behavioral Risk Factor Surveillance System	NHES	National Health Examination Survey
BWIS	Baltimore-Washington Infant Study	NHIS	National Health Interview Survey
CAD	coronary artery disease	NHLBI	National Heart, Lung, and Blood Institute
CDC	Centers for Disease Control and Prevention	NIDDK	National Institute of Diabetes and Digestive and Kidney Diseases
CHD	coronary heart disease	NIHSS	National Institutes of Health Stroke Scale
CHS	Cardiovascular Health Study	NINDS	National Institute of Neurological Disorders and Stroke
CI	confidence interval	NNHS	National Nursing Home Survey
CMS	Centers for Medicare and Medicaid Services	NOMAS	Northern Manhattan Study
COPD	Chronic obstructive pulmonary disease	NRMI	National Registry of Myocardial Infarction
CPI	Consumer Price Index	NVSS	National Vital Statistics System
CPR	cardiopulmonary resuscitation	OR	odds ratio
CVD	cardiovascular disease	PA	physical activity
DVT	deep vein thrombosis	PAD	peripheral arterial disease
ED	emergency department	PCI	percutaneous coronary intervention
EMS	emergency medical services	PE	pulmonary embolism
ER	emergency room	PTE	pulmonary thromboembolism
ESRD	end-stage renal disease	PVD	peripheral vascular disease
FHS	Framingham Heart Study	RF	rheumatic fever
GCNKSS	Greater Cincinnati/Northern Kentucky Stroke Study	RHD	rheumatic heart disease
GTWG	Get With The Guidelines <sup>SM</sup>	RR	relative risk
HBP	high blood pressure	SAH	subarachnoid hemorrhage
HCFA	Health Care Financing Administration	SCD	sudden cardiac death
HCUP	Healthcare Cost and Utilization Project	SES	socioeconomic status
HDL	high-density lipoprotein	SHS	Strong Heart Study
HF	heart failure	STEMI	ST elevation myocardial infarction
HHP	Honolulu Heart Program	TIA	transient ischemic attack
HIV	human immunodeficiency virus	UA	unstable angina
ICD	International Classification of Diseases	UNOS	United Network for Organ Sharing
ICDA	International Classification of Diseases, Adapted	USDA	United States Department of Agriculture
ICH	intracerebral hemorrhage	USDHHS	United States Department of Health and Human Services
JACC	Journal of the American College of Cardiology	VF	ventricular fibrillation
JAMA	Journal of the American Medical Association	VSD	ventricular septal defect
JCAHO	Joint Commission on Accreditation of Health Care Organizations	VTE	venous thromboembolism
JNC	Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure	WHO	World Health Organization
kcal	kilocalories	YLL	years of life lost
LDL	low-density lipoprotein	YMCLS	Youth Media Campaign Longitudinal Study
LV	left ventricular	YRBS	Youth Risk Behavior Surveillance
LVEF	left ventricular ejection fraction		



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For heart- or risk-related information,  
call 1-800-AHA-USA1 (1-800-242-8721)  
or contact your nearest office.

You can also visit us online at [americanheart.org](http://americanheart.org).

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

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

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

*The statistics in this brochure were up to date at publication.  
For the latest statistics, see the Heart Disease and Stroke Statistics Update at  
[americanheart.org/statistics](http://americanheart.org/statistics).*