



# Heart Disease & Stroke Statistics

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

## 2010 Update At-A-Glance

# Statistical Fact Sheets

Information for the population groups and risk factors listed below is available at [americanheart.org/statistics](http://americanheart.org/statistics) (click on “Statistical Fact Sheets”)

## Populations

African Americans and Cardiovascular Diseases	International Cardiovascular Disease Statistics
American Indians/Alaska Natives and Cardiovascular Diseases	Men and Cardiovascular Diseases
Asian/Pacific Islanders and Cardiovascular Diseases	Older Americans and Cardiovascular Diseases
Baby Boomers and Cardiovascular Diseases	Whites and Cardiovascular Diseases
Hispanics/Latinos and Cardiovascular Diseases	Women and Cardiovascular Diseases
International Cardiovascular Disease Death Rates	Youth and Cardiovascular Diseases

## Risk Factors

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

## Miscellaneous

Congenital Cardiovascular Defects
Hospital Discharges for Cardiovascular Diseases
Leading Causes of Death
Nutrition and Cardiovascular Diseases
Out-of-Hospital (Sudden) Cardiac Arrest

### **American Heart Association 2020 Impact Goal**

The American Heart Association has committed itself to the following 2020 Impact Goal: “By 2020, to improve the cardiovascular health of all Americans by 20 percent while reducing deaths from cardiovascular disease and stroke by 20 percent.” The metrics for achieving this new cardiovascular health goal will include measures from nationally representative datasets (NHANES) on smoking/ quitting prevalence, weight, physical activity and a healthy diet score, as well as levels of cholesterol, fasting blood glucose and blood pressure. Cardiovascular and stroke death rates will be monitored annually.

### **Note on Morbidity Data**

Population data used in the compilation of NHANES prevalence estimates will now agree with the latest year of the NHANES survey being used. Extrapolations for NHANES prevalence estimates are based on the census resident population for 2006 because this is the most recent year of NHANES data used in the Statistical Update. An exception is the provisional smoking data from the 2008 National Health Interview Survey.

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### **About These Statistics**

All statistics are for the most recent year available. Prevalence and hospitalizations are computed for 2006 unless otherwise indicated. Mortality data are final for 2006, unless otherwise indicated.

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](mailto:Nancy.Haase@heart.org), 214-706-1423. Direct all media inquiries to News Media Relations at [inquiries@heart.org](mailto:inquiries@heart.org) or 214-706-1173.

A more complete version of this update is available on our Web site, [americanheart.org/statistics](http://americanheart.org/statistics).

### **Acknowledgment**

We would like to thank the members of the American Heart Association Statistics Committee and the Stroke Statistics Subcommittee for their contributions to this publication.

### **Suggested Citation**

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Diseases and Risk Factors	Both Sexes	Total Males	White Males	Black Males	Mexican-American Males
<b>Total Cardiovascular Disease</b>					
Prevalence, 2006*	81.1 M (36.9%)	39.0 M (37.9%)	38.1%	44.6%	28.5%
Mortality, 2006†	831.3 K	398.6 K	340.6 K	48.0 K	NA
<b>Coronary Heart Disease</b>					
Prevalence, CHD, 2006*	17.6 M (7.9%)	9.2 M (9.1%)	9.4%	7.8%	5.3%
Prevalence, MI, 2006*	8.5 M (3.6%)	5.0 M (4.7%)	5.1%	3.6%	2.6%
Prevalence, AP, 2006*	10.2 M (4.6%)	4.7 M (4.6%)	4.7%	4.0%	2.9%
New and recurrent CHD‡§	1.26 M	740.0 K	675.0 K	70.0 K	NA
New and recurrent MI§	935.0 K	565.0 K	NA	NA	NA
Incidence, AP (stable angina)	500.0 K	320.0 K	NA	NA	NA
Mortality, 2006, CHD†	425.4 K	224.5 K	196.4 K	22.7 K	NA
Mortality, 2006, MI†	141.5 K	76.1 K	66.9 K	7.4 K	NA
<b>Stroke</b>					
Prevalence, 2006*	6.4 M (2.9%)	2.5 M (2.5%)	2.3%	3.8%	2.8%
New and recurrent strokes†	795.0 K	370.0 K	325.0 K	45.0 K	NA
Mortality, 2006†	137.1 K	54.5 K	45.2 K	7.4 K	NA
<b>High Blood Pressure</b>					
Prevalence, 2006*	74.5 M (33.6%)	35.7 M (34.4%)	34.3%	43.0%	25.9%
Mortality, 2006†	56.6 K	24.4 K	17.6 K	6.1 K	NA
<b>Heart Failure</b>					
Prevalence, 2006*	5.8 M (2.6%)	3.1 M (3.1%)	3.2%	3.0%	1.7%
Mortality, 2006†¶	282.8 K	123.6 K	110.3 K	10.9 K	NA
<b>Smoking</b>					
Prevalence, 2008#	46.0 M (20.6%)	24.8 M (23.1%)	23.5%	25.6%	NA
<b>Blood Cholesterol</b>					
Prevalence, 2006:					
Total cholesterol ≥200 mg/dL*	102.2 M (46.8%)	47.7 M (45.2%)	45.0%	40.2%	51.1%
Total cholesterol ≥240 mg/dL*	35.7 M (16.2%)	15.9 M (15.0%)	15.3%	10.9%	16.8%
LDL cholesterol ≥130 mg/dL*	71.2 M (32.6%)	34.9 M (33.1%)	31.5%	34.4%	42.7%
HDL cholesterol <40 mg/dL*	35.1 M (16.2%)	26.4 M (25.0%)	25.4%	14.7%	29.3%
<b>Physical Activity**</b>					
Prevalence, 2008#	32.5%	34.8%	NA	NA	NA
<b>Overweight and Obesity</b>					
Prevalence, 2006:					
Overweight and obesity, BMI ≥25.0 kg/m <sup>2</sup> *	144.1 M (66.3%)	75.5 M (71.7%)	71.4%	71.4%	75.1%
Obesity, BMI ≥30.0 kg/m <sup>2</sup> *	71.6 M (32.9%)	33.6 M (31.8%)	31.6%	35.2%	29.1%
<b>Diabetes Mellitus</b>					
Prevalence, 2006:					
Physician-diagnosed diabetes*	17.2 M (7.7%)	7.9 M (7.6%)	6.4%	12.8%	11.8%
Undiagnosed diabetes*	6.1 M (2.8%)	3.8 M (3.8%)	3.7%	3.8%	3.2%
Prediabetes*	63.2 M (29.0%)	37.5 M (35.9%)	35.9%	26.4%	33.3%
Incidence, diagnosed diabetes*	1.6 M	NA	NA	NA	NA
Mortality, 2006†	72.4 K	36.0 K	29.1 K	5.8 K	NA

**Note:** CVD indicates cardiovascular disease; M, millions; K, thousands; NA, Not available; CHD, coronary heart disease (includes heart attack, angina pectoris [chest pain] or both); MI, myocardial infarction (heart attack); AP, angina pectoris (chest pain); HBP, high blood pressure; HF, heart failure; mg/dL, milligrams per deciliter; LDL, low density lipoprotein; HDL, high density lipoprotein; PA, physical activity; BMI, body mass index; and kg/m<sup>2</sup>, kilograms per meter squared. \*Age ≥20 years, †All Ages, ‡New and recurrent MI and fatal CHD, §Age ≥35 years, ||Age ≥45 years, ¶Any mentions, #Age ≥18 years, \*\*Regular leisure-time PA, ††Hispanic.

**Sources:** See summary tables for each chapter in this update. For data on men in other ethnic groups, see other chapters and Statistical Fact Sheets.

Diseases and Risk Factors	Both Sexes	Total Females	White Females	Black Females	Mexican-American Females
<b>Total Cardiovascular Disease</b>					
Prevalence, 2006*	81.1 M (36.9%)	42.1 M (35.7%)	34.4%	46.9%	34.5%
Mortality, 2006†	831.3 K	432.7 K	372.8 K	50.8 K	NA
<b>Coronary Heart Disease</b>					
Prevalence, CHD, 2006*	17.6 M (7.9%)	8.4 M (7.0%)	6.9%	8.8%	6.6%
Prevalence, MI, 2006*	8.5 M (3.6%)	3.5 M (2.6%)	2.6%	2.9%	2.0%
Prevalence, AP, 2006*	10.2 M (4.6%)	5.5 M (4.6%)	4.5%	5.4%	4.8%
New and recurrent CHD‡§	1.26 M	515.0 K	445.0 K	65.0 K	NA
New and recurrent MI§	935.0 K	370.0 K	NA	NA	NA
Incidence AP (stable angina)	500.0 K	180.0 K	NA	NA	NA
Mortality, 2006, CHD†	425.4 K	200.9 K	175.0 K	21.8 K	NA
Mortality, 2006, MI†	141.5 K	65.4 K	56.6 K	7.4 K	NA
<b>Stroke</b>					
Prevalence, 2006*	6.4 M (2.9%)	3.9 M (3.2%)	3.1%	4.3%	3.1%
New and recurrent strokes†	795.0 K	425.0 K	365.0 K	60.0 K	NA
Mortality, 2006†	137.1 K	82.6 K	70.7 K	9.6 K	NA
<b>High Blood Pressure</b>					
Prevalence, 2006*	74.5 M (33.6%)	38.8 M (32.6%)	31.1%	44.8%	31.6%
Mortality, 2006†	56.6 K	32.2 K	24.9 K	6.5 K	NA
<b>Heart Failure</b>					
Prevalence, 2006*	5.8 M (2.6%)	2.7 M (2.1%)	2.1%	3.6%	1.8%
Mortality, 2006†¶	282.8 K	159.2 K	142.4 K	14.2 K	NA
<b>Smoking</b>					
Prevalence, 2008#	46.0 M (20.6%)	21.1 M (18.3%)	20.6%	17.8%	NA
<b>Blood Cholesterol</b>					
Prevalence, 2006:					
Total cholesterol ≥200 mg/dL*	102.2 M (46.8%)	54.5 M (47.9%)	48.7%	41.8%	49.0%
Total cholesterol ≥240 mg/dL*	35.7 M (16.2%)	19.7 M (17.2%)	18.1%	13.1%	14.3%
LDL cholesterol ≥130 mg/dL*	71.2 M (32.6%)	36.3 M (32.0%)	33.8%	28.6%	30.4%
HDL cholesterol <40 mg/dL*	35.1 M (16.2%)	8.7 M (7.9%)	7.9%	6.5%	11.7%
<b>Physical Activity**</b>					
Prevalence, 2008#	32.5%	30.6%	NA	NA	NA
<b>Overweight and Obesity</b>					
Prevalence, 2006:					
Overweight and Obesity, BMI ≥25.0 kg/m <sup>2</sup> *	144.1 M (66.3%)	68.6 M (61.0%)	57.5%	79.6%	74.1%
Obesity, BMI ≥30.0 kg/m <sup>2</sup> *	71.6 M (32.9%)	38.0 M (34.0%)	31.3%	53.2%	41.8%
<b>Diabetes Mellitus</b>					
Prevalence, 2006:					
Physician-diagnosed diabetes*	17.2 M (7.7%)	9.3 M (7.9%)	6.4%	13.0%	13.1%
Undiagnosed diabetes*	6.1 M (2.8%)	2.3 M (1.9%)	1.8%	2.3%	3.8%
Prediabetes*	63.2 M (29.0%)	25.7 M (22.2%)	21.7%	22.3%	26.6%
Incidence, diagnosed diabetes*	1.6 M	NA	NA	NA	NA
Mortality, 2006†	72.4 K	36.4 K	28.1 K	7.0 K	NA

**Note:** CVD indicates cardiovascular disease; M, millions; K, thousands; NA, Not available; CHD, coronary heart disease (includes heart attack, angina pectoris [chest pain] or both); MI, myocardial infarction (heart attack); AP, angina pectoris (chest pain); HBP, high blood pressure; HF, heart failure; mg/dL, milligrams per deciliter; LDL, low density lipoprotein; HDL, high density lipoprotein; PA, physical activity; BMI, body mass index; and kg/m<sup>2</sup>, kilograms per meter squared. \*Age ≥20 years, †All Ages, ‡New and recurrent MI and fatal CHD, §Age ≥35 years, ||Age ≥45 years, ¶Any mentions, #Age ≥18 years, \*\*Regular leisure-time PA, ††Hispanic.

**Sources:** See summary tables for each chapter in this update. For data on women in other ethnic groups, see other chapters and Statistical Fact Sheets.

Diseases and Risk Factors	Both Sexes	Whites		Blacks		Mexican Americans		Hispanics/Latinos		Asians	American Indians/Alaska Natives
		Males	Females	Males	Females	Males	Females	Males	Females	Both Sexes	Both Sexes
<b>Total Cardiovascular Disease</b>											
Prevalence 2006*	81.1 M (36.9%)	38.1%	34.4%	44.6%	46.9%	28.5%	34.5%	NA	NA	NA	NA
Mortality 2006†	831.3 K	340.6 K	372.8 K	48.0 K	50.8 K	NA	NA	NA	NA	NA	NA
<b>Coronary Heart Disease</b>											
Prevalence, CHD, 2006*	17.6 M (7.9%)	9.4%	6.9%	7.8%	8.8%	5.3%	6.6%	5.7%  ††	2.9%  ††	6.6%  ††	
Prevalence, MI, 2006*	8.5 M (3.6%)	5.1%	2.6%	3.6%	2.9%	2.6%	2.0%	NA	NA	NA	NA
Prevalence, AP, 2006*	10.2 M (4.6%)	4.7%	4.5%	4.0%	5.4%	2.9%	4.8%	NA	NA	NA	NA
New and recurrent CHD‡§	1.26 M	675.0 K	445.0 K	70.0 K	65.0 K	NA	NA	NA	NA	NA	NA
Mortality, CHD, 2006†	425.4 K	196.4 K	175.0 K	22.7 K	21.8 K	NA	NA	NA	NA	NA	NA
Mortality, MI, 2006†	141.5 K	66.9 K	56.6 K	7.4 K	7.4 K	NA	NA	NA	NA	NA	NA
<b>Stroke</b>											
Prevalence, 2006*	6.4 M (2.9%)	2.3%	3.1%	3.8%	4.3%	2.8%	3.1%	2.6%  ††	1.8%  ††	3.9%  ††	
New and recurrent strokes†	795.0 K	325.0 K	365.0 K	45.0 K	60.0 K	NA	NA	NA	NA	NA	NA
Mortality, 2006†	137.1 K	45.2 K	70.7 K	7.4 K	9.6 K	NA	NA	NA	NA	NA	NA
<b>High Blood Pressure</b>											
Prevalence, 2006*	74.5 M (33.6%)	34.3%	31.1%	43.0%	44.8%	25.9%	31.6%	21.0%  ††	21.0%  ††	25.3%  ††	
Mortality, 2006†	56.6 K	17.6 K	24.9 K	6.1 K	6.5 K	NA	NA	NA	NA	NA	NA
<b>Heart Failure</b>											
Prevalence, 2006*	5.8 M (2.6%)	3.2%	2.1%	3.0%	3.6%	1.7%	1.8%	NA	NA	NA	NA
Mortality, 2006†¶	282.8 K	110.3 K	142.4 K	10.9 K	14.2 K	NA	NA	NA	NA	NA	NA
<b>Smoking</b>											
Prevalence, 2008	46.0 M (20.6%)	23.5%	20.6%	25.6%	17.8%	14.9%	20.7%	10.7%	9.9%	24.3%	
<b>Blood Cholesterol</b>											
Prevalence, 2006:											
Total cholesterol ≥200 mg/dL*	102.2 M (46.8%)	45.0%	48.7%	40.2%	41.8%	51.1%	49.0%	NA	NA	NA	NA
Total cholesterol ≥240 mg/dL*	35.7 M (16.2%)	15.3%	18.1%	10.9%	13.1%	16.8%	14.3%	29.9%#	29.2%	31.2%	
LDL cholesterol ≥130 mg/dL*	71.2 M (32.6%)	31.5%	33.8%	34.4%	28.6%	42.7%	30.4%	NA	NA	NA	NA
HDL cholesterol <40 mg/dL*	35.1 M (16.2%)	25.4%	7.9%	14.7%	6.5%	29.3%	11.7%	NA	NA	NA	NA
<b>Physical Activity**</b>											
Prevalence, 2008	32.5%	35.9%	24.8%	NA	NA	25.2%	NA	NA	NA	NA	
<b>Overweight and Obesity</b>											
Prevalence, 2006:											
Overweight and obesity,											
BMI ≥25.0 kg/m²*	144.1 M (66.3%)	71.4%	57.5%	71.4%	79.6%	75.1%	74.1%	70.3%  ††	40.7%  ††	69.6%  ††	
Obesity BMI ≥30.0 kg/m²*	71.6 M (32.9%)	31.6%	31.3%	35.2%	53.2%	29.1%	41.8%	31.3%  ††	9.4%  ††	42.1%  ††	
<b>Diabetes Mellitus</b>											
Prevalence, 2006:											
Physician-diagnosed diabetes*	17.2 M (7.7%)	6.4%	6.4%	12.8%	13.0%	11.8%	13.1%	11.0%  ††	8.0%  ††	15.0%  ††	
Undiagnosed diabetes*	6.1 M (2.8%)	3.7%	1.8%	3.8%	2.3%	3.2%	3.8%	NA	NA	NA	NA
Prediabetes*	63.2 M (29.0%)	35.9%	21.7%	26.4%	22.3%	33.3%	26.6%	NA	NA	NA	NA
Incidence, diagnosed diabetes*	1.6 M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mortality, 2006†	72.4 K	29.1 K	28.1 K	5.8 K	7.0 K	NA	NA	NA	NA	NA	NA

**Note:** CVD indicates cardiovascular disease; M, millions; K, thousands; NA, Not available; CHD, coronary heart disease (includes heart attack, angina pectoris [chest pain] or both); MI, myocardial infarction (heart attack); AP, angina pectoris (chest pain); HBP, high blood pressure; HF, heart failure; mg/dL, milligrams per deciliter; LDL, low density lipoprotein. HDL, high density lipoprotein; PA, physical activity; BMI, body mass index; and kg/m², kilograms per meter squared. \*Age ≥20 years, †All Ages, ‡New and recurrent MI and fatal CHD, §Age ≥35 years, ||Age ≥18 years, ¶Any mentions, #Behavioral Risk Factor Surveillance System., \*\*Regular leisure-time PA, ††2008 NIH.

**Sources:** See summary tables for each chapter in this update. For data on other ethnic groups, see other chapters and Statistical Fact Sheets.

Diseases and Risk Factors	Both Sexes	Total		Whites		Blacks		Mexican Americans	
		Males	Females	Males	Females	Males	Females	Males	Females
<b>Congenital Cardiovascular Defects</b>									
Mortality, 2006*	3.5 K	2.0 K	1.6 K	1.5 K	1.2 K	0.4 K	0.3 K	NA	NA
Mortality, 2006 (age <15)	1.9 K	1.1 K	0.9 K	0.8 K	0.6 K	0.2 K	0.2 K	NA	NA
<b>Smoking</b>									
High school students, grades 9 to 12:									
Current cigarette smoking, 2007	20.0%	21.3%	18.7%	23.8%	22.5%	14.9%	8.4%	18.7%†	14.6%†
Current cigar smoking, 2007	13.6%	19.4%	7.6%	22.0%	7.4%	13.2%	6.7%	16.3%†	9.0%†
Smokeless tobacco use, 2007	7.9%	13.4%	2.3%	18.0%	2.5%	2.0%	0.5%	6.7%†	2.7%†
<b>Blood Cholesterol</b>									
Mean total cholesterol, mg/dL									
Ages 4 to 11	165.1	164.6	165.6	165.2	166.1	165.6	164.9	161.7	163.1
Ages 12 to 19	161.1	157.5	164.8	155.8	166.3	161.3	162.9	158.9	162.3
Mean HDL cholesterol, mg/dL									
Ages 4 to 11	55.7	56.7	54.7	55.9	54.0	60.9	58.0	54.5	52.9
Ages 12 to 19	52.4	49.4	55.6	47.6	55.2	54.8	57.7	49.6	53.8
Mean LDL cholesterol, mg/dL									
Ages 12 to 19	89.2	87.5	90.9	87.1	91.5	89.0	91.5	88.7	91.6
<b>Physical Activity‡</b>									
Prevalence, grades 9 to 12, 2007§									
Met currently recommended levels of PA	34.7%	43.7%	25.6%	46.1%	27.9%	41.3%	21.0%	38.6%†	21.9%†
<b>Overweight and Obesity</b>									
Prevalence, 2006:									
Children and adolescents, ages 2 to 19 (overweight or obese)									
	23.5 M (31.9%)	12.3 M (32.7%)	11.2 M (31.0%)	31.9%	29.5%	30.8%	39.2%	40.8%	35.0%
Students in grades 9 to 12§ (overweight only)									
	15.8%	15.1%	9.6%	15.7%	12.8%	16.6%	21.4%	18.3%†	17.9%†

**Note:** CVD indicates cardiovascular disease; K, thousands; NA, data not available; mg/dL, milligrams per deciliter; HDL, high-density lipoprotein; LDL, low-density lipoprotein; PA, physical activity; and M, millions. Overweight indicates a body mass index in the 95th percentile of the Centers for Disease Control and Prevention 2000 growth chart. \*All ages, †Hispanic, ‡Regular leisure-time PA, §Centers for Disease Control and Prevention.

**Sources:** See summary tables for related chapters in this update. For more data on congenital defects, see Chapter 7, and our Statistical Fact Sheets.

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

## Prevalence

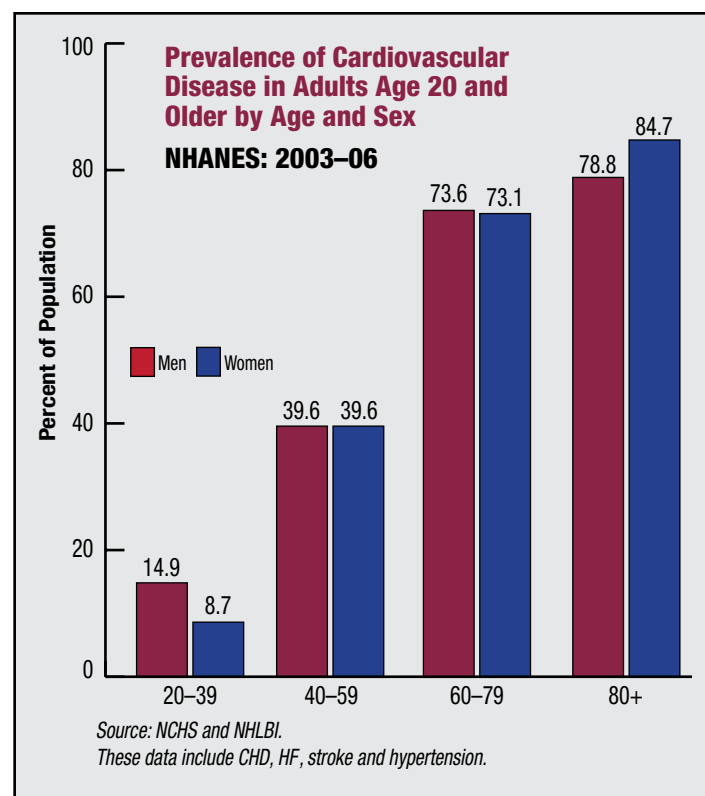
An estimated 81,100,000 American adults (more than one in three) have one or more types of cardiovascular disease (CVD). Of these, 38,100,000 are estimated to be age 60 or older. Total CVD includes diseases in the bullet points below except for congenital CVD. Due to overlap, it is not possible to add these conditions to arrive at a total.

- High blood pressure (HBP) — 74,500,000. (Defined as systolic pressure 140 mm Hg or greater and/or diastolic pressure 90 mm Hg or greater, taking antihypertensive medication or being told at least twice by a physician or other health professional that you have HBP.)
- Coronary heart disease (CHD) — 17,600,000.
  - Myocardial infarction (MI, or heart attack) — 8,500,000.
  - Angina pectoris (AP, or chest pain) — 10,200,000.
- Heart failure (HF) — 5,800,000.
- Stroke — 6,400,000.
- Congenital cardiovascular defects — 650,000–1,300,000.
- The following prevalence estimates are for people age 18 and older from NCHS/NHIS, 2008: (*Vital Health Stat 10.No.242.2009.*)
  - Among whites only, 12.1 percent have heart disease, 6.5 percent have CHD, 23.3 percent have hypertension and 2.7 percent have had a stroke.
  - Among blacks or African Americans, 10.2 percent have heart disease, 5.6 percent have CHD, 31.8 percent have hypertension and 3.6 percent have had a stroke.
  - Among Hispanics or Latinos, 8.1 percent have heart disease, 5.7 percent have CHD, 21.0 percent have hypertension and 2.6 percent have had a stroke.
  - Among Asians, 5.2 percent have heart disease, 2.9 percent have CHD, 21.0 percent have hypertension and 1.8 percent have had a stroke.
  - Among Native Hawaiians or other Pacific Islanders, 19.7 percent have hypertension (estimate may be unreliable; other prevalence estimates not available).
  - Among American Indians or Alaska Natives, 12.1 percent have heart disease, 6.6 percent have CHD (estimate may be unreliable), 25.3 percent have hypertension, and 3.9 percent have had a stroke (estimate may be unreliable).
  - Asian Indian Adults (9 percent) are about two-fold more likely than Korean adults (4 percent) to have ever been told they have heart disease. (*Advance Data from Vital and Health Statistics. No. 394. 2008*)

## Incidence

Based on the NHLBI's Framingham Heart Study (FHS) original and offspring cohort (1980–2003)... (*Incidence and Prevalence: 2006 Chart Book on Cardiovascular and Lung Diseases. Bethesda, Md.: National Heart, Lung, and Blood Institute, May 2006*)

- The average annual rates of first major cardiovascular events rise from three per 1,000 men at ages 35–44 to 74 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 stroke 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, Northwestern University, Chicago, Ill.*)



## Mortality

- Final mortality data show that CVD (I00–I99, Q20–Q28) as the underlying cause of death (including congenital cardiovascular defects) accounted for 34.3 percent (831,272) of all 2,426,264 deaths in 2006, or one of every 2.9 deaths in the United States. CVD any mention deaths (1,347,000 deaths in 2006) accounted for about 56 percent of all deaths in 2006. (*NCHS. Health Data Interactive*)
- In every year since 1900, except 1918, CVD accounted for more deaths than any other major cause of death in the United States. (*NCHS*)
- Nearly 2,300 Americans die of CVD each day, an average of one death every 38 seconds. CVD claims more lives each year as cancer, chronic lower respiratory diseases and accidents combined. (*NCHS. Health Data Interactive*)
- The 2006 overall death rate from CVD (I00–I99) was 262.5. The rates were 306.6 for white males and 422.8 for black males; 215.5 for white females and 298.2 for black females. From 1996–2006, death rates from CVD (ICD/10 I00–I99) declined 29.2 percent. In the same 10-year period, actual CVD deaths declined 12.9 percent. (Appropriate comparability ratios were applied.) (*NCHS. Health Data Interactive*)
- Other causes of death in 2006 — cancer, 559,888; accidents, 121,599; Alzheimer's disease, 72,432; HIV (AIDS), 12,113. (*NCHS. Health Data Interactive*)
- Final 2006 CVD death rates were 313.3 for males and 221.6 for females. Cancer (malignant neoplasms) death rates were 220.1 for males and 153.6 for females. Breast cancer claimed the lives of 40,821 females in 2006; lung cancer claimed 69,385. Death rates for females were 23.5 for breast cancer and 40.0 for lung cancer. One in 30 female deaths was from breast cancer, while one in six was from CHD. By comparison, one in 4.5 female deaths was of cancer while one in 2.8 was of CVD. Based on 2006 mortality, CVD caused about a death a minute among females — 432,709 female lives in 2006. That's more female lives than were claimed by cancer, chronic lower respiratory diseases, Alzheimer's disease and accidents combined. (*NCHS. Health Data Interactive*)
- More than 151,000 Americans killed by CVD (I00–I99) in 2006 were under age 65. In 2006, nearly 33 percent of deaths from CVD occurred prematurely (i.e., before age 75, which is well below the average life expectancy of 77.7 years). (*NCHS. Health Data Interactive*)

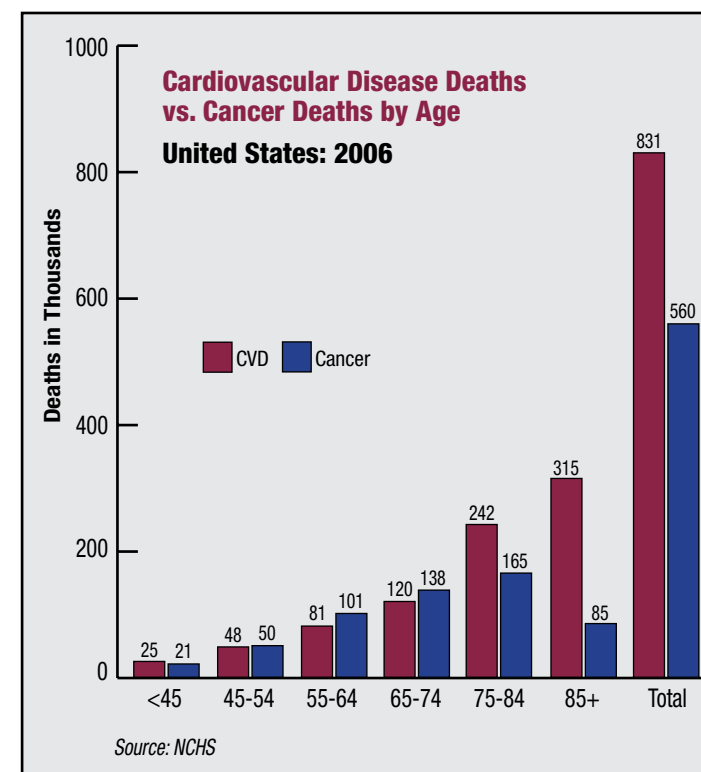
- In 2006, the leading causes of death in women age 65 and older were diseases of the heart (No. 1), cancer (No. 2), stroke (No. 3) and chronic lower respiratory diseases (No. 4). In older men, they were diseases of the heart (No. 1), cancer (No. 2), chronic lower respiratory diseases (No. 3) and stroke (No. 4). (*NCHS. Health Data Interactive; Centers for Disease Control and Prevention. WISQARS leading causes of death reports, 1999–2006.*)

## Out-of-Hospital Cardiac Arrest

- Each year there are an estimated 295,000 emergency medical services-treated out-of-hospital cardiac arrests occur in the United States. (*JAMA. 2008;300:1423-1431.*)
- About 60 percent of unexpected cardiac deaths are treated by EMS. (*J Am Coll Cardiol. 2004;44:1268–75.*)
- On average, 31.4 percent of out-of-hospital cardiac arrests receive bystander cardiopulmonary resuscitation (CPR). (*Personal communication with Graham Nichol, M.D.*)

## CPR Awareness

- Seventy-nine percent of the lay public are confident that they know what actions to take in a medical emergency. Ninety-eight percent recognize an automated external defibrillator as a device that administers an electrical shock to restore the heart beat of sudden cardiac arrest victims, and 60 percent are familiar with CPR. (*Harris Interactive Survey conducted on behalf of the American Heart Association, Jan. 8, 2008 through Jan. 21, 2008.*)

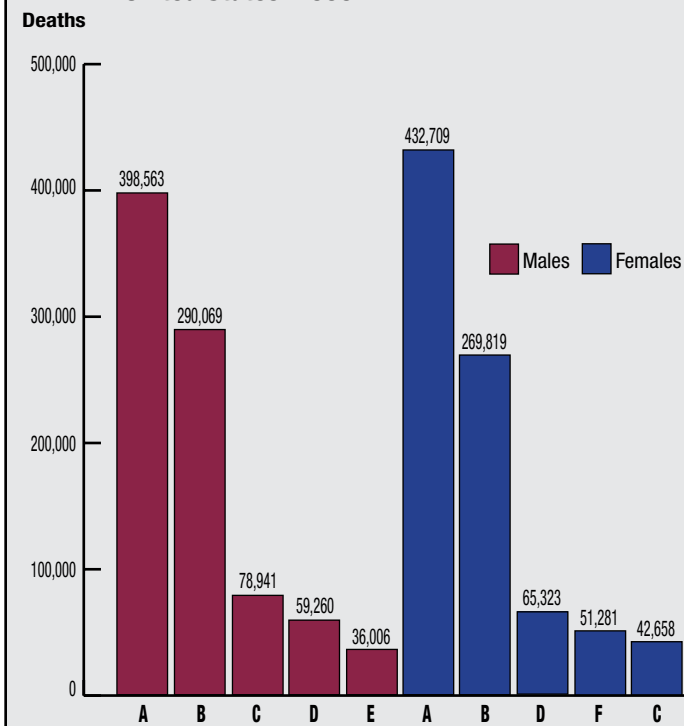


## Risk Factors/Family History Healthy Lifestyle

- In respondents ages 18–74, data from the 2000 BRFSS 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.)
- According to data from the Framingham Heart Study, the occurrence of a premature atherosclerotic CVD event in a parent or sibling is associated with about a two-fold increased risk of CVD, independent of other risk factors. (*JAMA.* 2004;291:2204–11; *JAMA.* 2005; 294:3117–23.)
- In a study of 7,900 men and women, at age 50 those with an “optimal” risk factor burden (blood pressure below 120/80 mm Hg, total cholesterol below 180 mg/dL, absence of diabetes, nonsmoker) had a median life expectancy 10 or more years longer than those with two or more major risk factors. (*Circulation.* 2006;113:791–8.)
- In people 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 relative 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)

## Cardiovascular Disease and Other Major Causes of Death for All Males and Females

United States: 2006



Source: NCHS and NHLBI.

### Males

CVD+Congenital Cardiovascular Defects	A
Cancer	B
Accidents	C
Chronic Lower Respiratory Disease	D
Diabetes	E

### Females

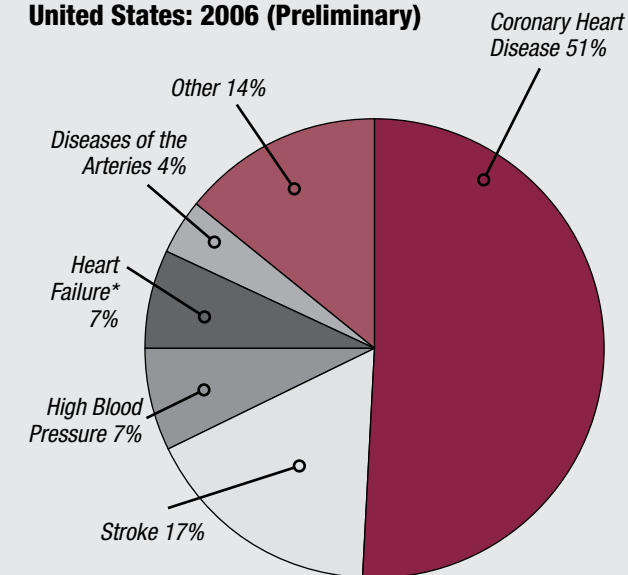
CVD+Congenital Cardiovascular Defects	A
Cancer	B
Chronic Lower Respiratory Disease	D
Alzheimer's	F
Accidents	C

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

- From 1996–2006, the number of inpatient discharges from shortstay hospitals with CVD as the first listed diagnosis increased from 6,107,000 to 6,161,000 discharges. In 2006, CVD ranked highest among all disease categories in hospital discharges. (*2006 National Hospital Discharge Survey. National Health Statistics Reports. No. 5.*)
- In 2007, there were 79,697,000 physician office visits, hospital emergency department visits and outpatient visits with a primary diagnosis of CVD. (*National Ambulatory Medical Care Survey: 2007 Summary.*)
- In 2007, there were 4,048,000 visits to emergency departments with a primary diagnosis of CVD. (*National Ambulatory Medical Care Survey: 2007 Emergency Department Summary.*)
- In 2007, there were 7,929,000 outpatient department visits with a primary diagnosis of CVD. (*Vital Health Stat13. June 2009;[167]:1-155.*)
- In 2005, about one of every six hospital stays was due to CVD. (*AHRQ, NIS*)

## Percentage Breakdown of Deaths from Cardiovascular Diseases

United States: 2006 (Preliminary)

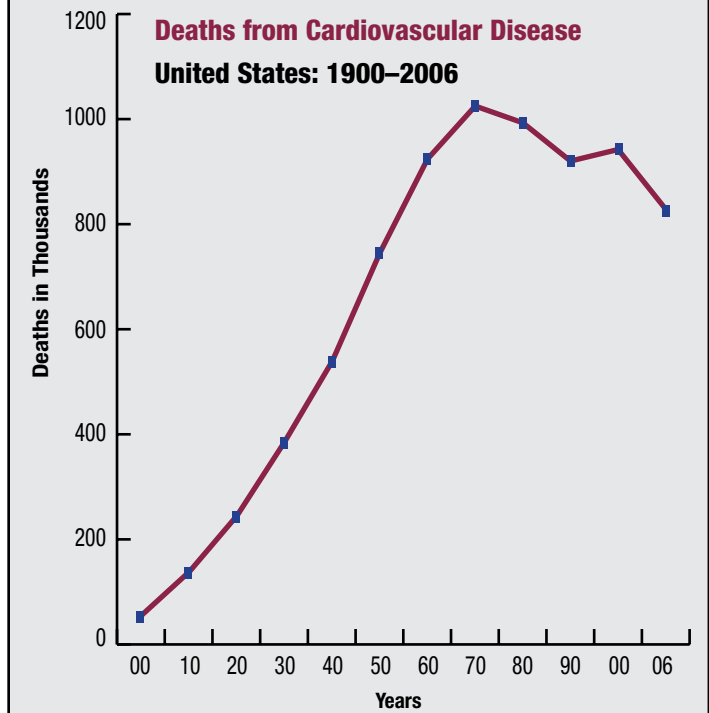


\*Not a true underlying cause. Heart failure, any mention mortality was 282,754 in 2006.

Source: NCHS.

Note: May not add to 100% due to rounding.

## Deaths from Cardiovascular Disease United States: 1900–2006



Source: NCHS.

Note: Cardiovascular disease does not include congenital heart disease.

## Operations and Procedures

- In 2006, an estimated 7,235,000 inpatient cardiovascular operations and procedures were performed in the United States; 4.1 million were performed on males and 3.1 million were performed on females. (*NHDS, NCHS and NHLBI.*)

## Cost

- The estimated direct and indirect cost of CVD for 2010 is \$503.2 billion.

2006 Age-Adjusted Death Rates for Cardiovascular Disease (CVD), Coronary Heart Disease (CHD) and Stroke by State (includes District of Columbia and Puerto Rico)

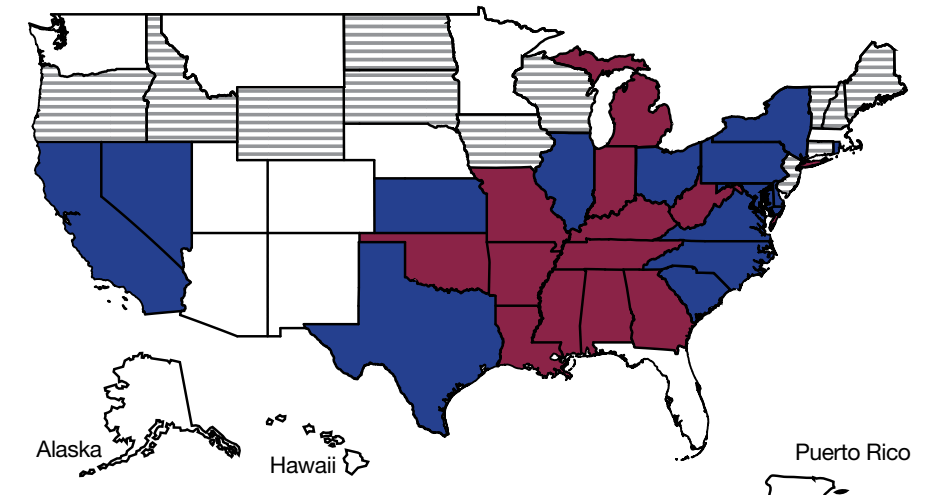
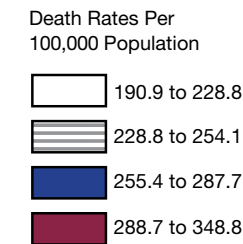
State	CVD*			CHD**			Stroke#		
	Rank##	Death Rate	% Change+ 1996 to 2006	Rank##	Death Rate	% Change+ 1996 to 2006	Rank##	Death Rate	% Change+ 1996 to 2006
Alabama	51	330.9	-17.2	25	121.7	-32.4	51	55.5	-18.8
Alaska	11	227.5	-28.5	4	87.4	-38.2	34	46.8	-31.9
Arizona	5	215.4	-28.9	24	120.8	-31.1	3	34.5	-39.6
Arkansas	48	311.0	-23.8	47	160.1	-22.0	52	58.8	-35.1
California	29	257.3	-27.8	34	139.0	-36.3	29	44.9	-32.3
Colorado	4	212.8	-29.2	6	96.3	-35.9	13	38.7	-35.2
Connecticut	18	232.3	-35.1	13	110.0	-42.3	8	36.5	-37.7
Delaware	27	255.4	-26.1	37	140.8	-31.4	18	41.8	-24.0
District of Columbia	50	325.7	-19.1	52	193.5	+7.0	10	37.6	-45.9
Florida	10	227.4	-30.1	28	129.2	-37.2	4	35.3	-33.3
Georgia	41	288.8	-28.2	12	108.7	-41.5	43	51.4	-33.6
Hawaii	2	206.2	-30.9	3	85.2	-40.2	22	43.2	-32.9
Idaho	20	238.5	-25.3	14	110.2	-34.0	44	51.6	-27.3
Illinois	33	268.2	-29.8	31	134.8	-39.4	31	45.4	-33.0
Indiana	40	288.7	-27.7	35	139.7	-36.0	39	49.1	-34.8
Iowa	22	246.7	-29.6	39	141.6	-36.2	20	42.9	-31.6
Kansas	28	255.4	-26.1	17	114.1	-35.0	33	46.7	-28.0
Kentucky	44	307.7	-25.6	42	148.6	-32.2	42	50.5	-30.4
Louisiana	46	308.4	-22.4	33	138.3	-32.4	46	52.1	-24.7
Maine	17	232.2	-33.1	15	112.2	-43.3	17	41.3	-28.6
Maryland	32	266.6	-25.4	40	141.7	-29.7	23	43.6	-31.6
Massachusetts	8	224.0	-31.3	9	105.6	-39.9	11	37.7	-28.2
Michigan	42	291.7	-27.8	45	156.6	-35.2	28	44.5	-34.5
Minnesota	1	190.9	-35.9	2	79.7	-45.5	14	39.3	-40.1
Mississippi	52	348.8	-23.4	41	146.8	-38.1	49	53.7	-25.7
Missouri	43	293.2	-27.4	44	155.2	-34.2	41	49.4	-27.3
Montana	7	223.3	-30.2	7	99.0	-36.1	16	41.2	-33.9
Nebraska	13	228.8	-34.5	5	89.9	-44.0	25	43.9	-29.5
Nevada	39	287.7	-22.0	23	119.5	-38.5	15	39.7	-33.8
New Hampshire	16	230.1	-34.4	21	116.3	-42.7	5	35.4	-47.4
New Jersey	26	254.1	-30.1	38	141.2	-36.1	6	35.9	-33.8
New Mexico	9	224.0	-24.4	18	114.6	-30.8	9	37.5	-35.9
New York	37	278.6	-30.9	51	181.2	-32.9	1	29.7	-37.2
North Carolina	34	268.2	-30.4	27	126.1	-39.3	47	52.4	-36.0
North Dakota	23	246.7	-28.8	30	133.7	-26.6	40	49.2	-29.8
Ohio	38	283.8	-28.0	43	154.0	-32.6	30	45.2	-28.1
Oklahoma	49	322.0	-21.2	50	177.4	-23.2	48	53.3	-23.0
Oregon	14	228.8	-29.6	8	99.2	-40.2	36	48.0	-38.8
Pennsylvania	35	268.8	-29.9	32	136.0	-37.4	24	43.6	-30.0
Puerto Rico++	6	219.4	-27.5	10	106.6	-23.7	26	43.9	-25.0
Rhode Island	24	249.8	-25.7	48	162.4	-27.3	2	31.4	-38.4
South Carolina	36	270.5	-33.1	22	119.2	-43.0	45	51.6	-41.8
South Dakota	19	235.6	-30.0	36	140.0	-27.7	19	42.4	-30.9
Tennessee	45	307.7	-25.1	49	167.8	-30.0	50	54.6	-31.2
Texas	31	262.8	-28.6	29	132.2	-37.4	37	48.3	-30.5
Utah	3	208.2	-28.0	1	77.5	-44.0	7	36.2	-40.7
Vermont	15	229.3	-33.0	26	124.5	-37.8	12	37.8	-39.7
Virginia	30	258.1	-31.1	20	115.6	-36.8	38	49.0	-33.5
Washington	12	228.0	-28.7	19	114.7	-31.7	21	42.9	-39.0
West Virginia	47	309.2	-27.4	46	158.7	-35.8	35	47.6	-21.7
Wisconsin	21	241.8	-30.9	16	113.9	-39.2	27	44.3	-38.9
Wyoming	25	250.1	-26.6	11	107.1	-36.5	32	45.4	-37.2
<b>Total United States</b>	<b>262.5</b>	<b>-29.5</b>	<b>135.0</b>	<b>-35.9</b>	<b>43.6</b>	<b>-32.7</b>			

( ) = data not available \* CVD is defined here as ICD/10 I00-I99. \*\* CHD is defined here as ICD/10 I20-I25. # Stroke is defined here as ICD/10 I60-I69. ## Rank is lowest to highest. +Percent change, is based on log linear slope of rates for each year, 1996-2006. For stroke, the death rates in 1996-1998 were comparability modified, using the ICD/10 to ICD/9 comparability ratio of 1.0502. ++Percent changes for Puerto Rico are for 1996-1998 (averaged) to 2006 and are not based on a log linear slope.

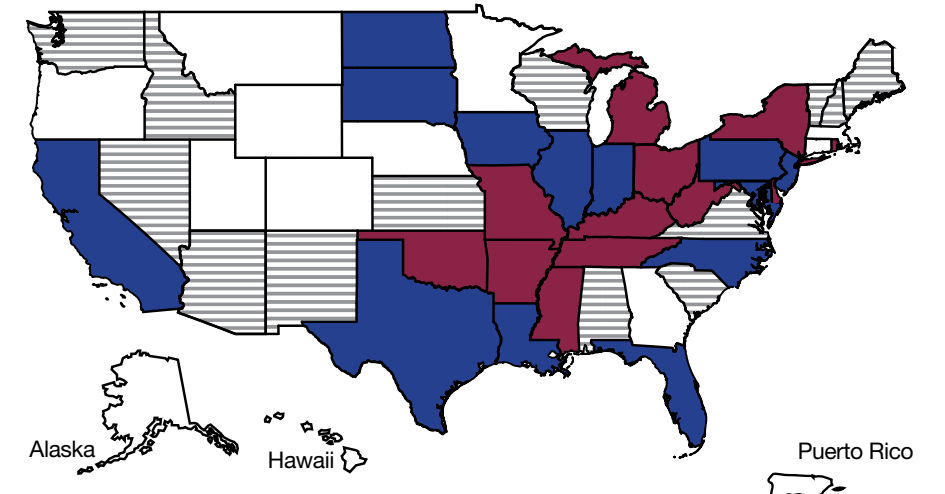
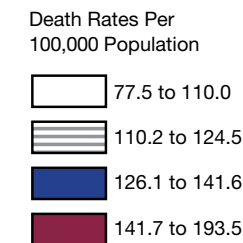
Source: NCHS compressed mortality file 1979-2006. Data provided by personal communication with NHLBI.

Death Rates by State – Statistics (Includes District of Columbia)

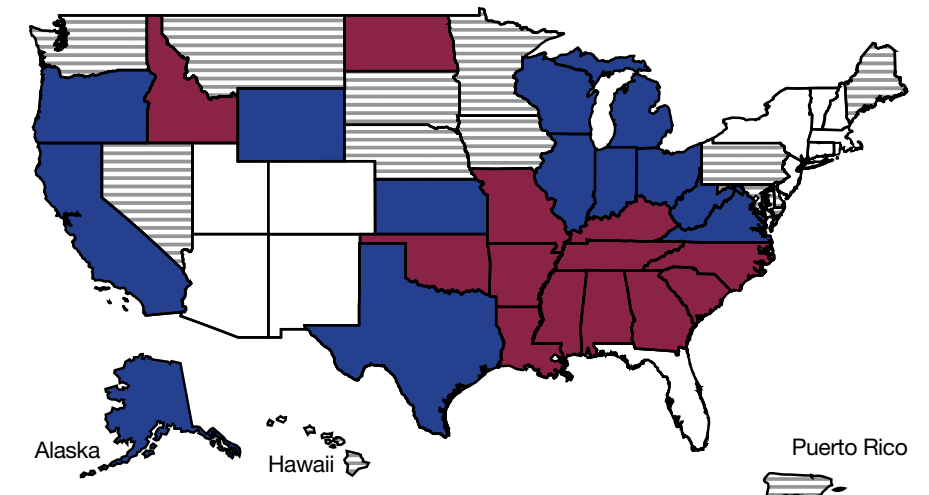
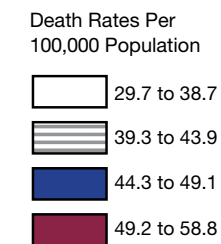
2006 Total Cardiovascular Disease Age-Adjusted Death Rates by State



2006 Coronary Heart Disease Age-Adjusted Death Rates by State



2006 Stroke Age-Adjusted Death Rates by State



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

### Prevalence

- On the basis of data from NHANES 2003 to 2006, an estimated 17,600,000 American adults age 20 and older have coronary heart disease (CHD). Total CHD prevalence is 7.9 percent in U.S. adults age 20 and older (9.1 percent for men and 7.0 percent for women).
- Among U.S. adults age 20 and older, the overall prevalence of myocardial infarction (MI, or heart attack) is 3.6 percent (4.7 percent for men and 2.6 percent for women).

### Incidence

This year an estimated 785,000 Americans will have a new coronary attack and about 470,000 will have a recurrent attack. It is estimated that an additional 195,000 silent heart attacks occur each year. (*Hurst's The Heart, Arteries and Veins. 10th ed. New York, NY: McGraw-Hill, 2001: 3-7; Am J Cardiol. 2002;90:927-931.*)

- The estimated annual incidence of heart attack (myocardial infarction, MI) is 610,000 new attacks and 325,000 recurrent attacks annually. (*Hurst's The Heart, Arteries and Veins. 10th ed. New York, NY: McGraw-Hill, 2001: 3-7; Am J Cardiol. 2002;90:927-931.*)
- The average age of a person having a first heart attack is 64.5 for men and 70.3 for women. (*Hurst's The Heart, Arteries and Veins. 10th ed. New York, NY: McGraw-Hill, 2001: 3-7; Am J Cardiol. 2002;90:927-931.*)
- Based on the NHLBI's Framingham Heart Study (FHS)...
  - CHD makes up more than half of all cardiovascular events in men and women under age 75. (*Hurst's The Heart, Arteries and Veins. 10th ed. New York, NY: McGraw-Hill, 2001: 3-7.*)
  - The lifetime risk of developing CHD after age 40 is 49 percent for men and 32 percent for women. (*Lancet. 1999;353:89-92.*)

### Mortality

- CHD caused about one of every six deaths in the United States in 2006. It is the largest major killer of American males and females. (*Natl Vital Stat Rep. 2009;57:1-80.*)
- Final 2006 CHD mortality was 425,425 (224,510 males, 200,915 females). CHD any mention mortality in 2006 was 587,000 (see glossary for definition of "any mention" mortality). (*Vital Statistics of the United States, NCHS.*)
- Final 2006 MI mortality was 141,462 (76,089 males, 65,373 females). MI any mention mortality in 2006 was 181,000 (see glossary for definition of "any mention" mortality). (*Vital Statistics of the United States, NCHS.*)
- About every 25 seconds, an American will suffer a coronary event, and about every minute someone will die from one. (*AHA computation based on latest available mortality data.*)

- About every 34 seconds, an American will suffer a heart attack. (*AHA computation based on latest available mortality data.*)
- About 81 percent of people who die of CHD are age 65 or older. (*AHA computation based on latest available mortality data.*)
- From 1996-2006, the death rate from CHD declined 36.4 percent and the actual number of deaths declined 21.9 percent. (*NCHS. Compressed mortality file: underlying cause of death, 1979 to 2006; http://wonder.cdc.gov/mortSQL.html*)
- The final overall 2006 CHD death rate was 134.9 per 100,000 population. Death rates were 176.3 for white males and 206.4 for black males; for white females, the rate was 101.5, and for black females it was 130.0. (*NCHS. Compressed mortality file: underlying cause of death, 1979 to 2006; http://wonder.cdc.gov/mortSQL.html*)
- Final 2006 CHD death rates were 132.8 for Hispanic or Latino males and 85.4 for females; 122.4 for American Indian or Alaska Native males and 76.4 for females; and 101.3 for Asian or Pacific Islander males and 58.9 for females. (*Natl Vital Stat Rep. 2009;57:1-80.*)
- The estimated average number of years of life lost due to a heart attack is 15. (*Natl Vital Stat Rep. 2008;56[10]:1-20.*)
- A recent study of the decrease in U.S. deaths from CHD from 1980 to 2000 found that about 47 percent of the decrease was attributable to evidence-based medical therapies and 44 percent to changes in risk factors. Nevertheless, these improvements have been offset by increases in body mass index and diabetes prevalence. (*N Engl J Med. 2007;356:2388-2398.*)

### Risk Factors and Awareness of Warning Signs

- 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.*)

- According to BRFSS findings, patients with CHD are less likely to comply with physical activity recommendations than people without CHD. (*Am J Cardiol. 2008;101:557-561.*)
- In 2005, among BRFSS participants from 14 states and Washington, D.C., only 27 percent could name five heart attack warning signs. (*MMWR Morb Mortal Wkly Rep. 2008;57:175-179.*)

### 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. (*Hurst's The Heart, Arteries and Veins. 10th ed. New York, NY: McGraw-Hill, 2001: 3-7.*)

- 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 and Ambulatory Care Visits

From 1996-2006, the number of inpatient discharges from shortstay hospitals with CHD as the first listed diagnosis decreased from 2,272,000 to 1,760,000. (*NHDS/NCHS.*)

### Cost

- The estimated direct and indirect 2010 cost of CHD is \$177.1 billion.

### Operations and Procedures (Hospital Inpatients)

- In 2006, an estimated 1,313,000 inpatient percutaneous coronary intervention procedures, 448,000 inpatient bypass procedures, 1,115,000 inpatient diagnostic cardiac catheterizations, 114,000 inpatient implantable defibrillators and 418,000 pacemaker procedures were performed in the United States. (*Natl Health Stat Rep. 2008;5:1-20.*)

### Acute Coronary Syndrome

(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 usually occurs while at rest. The discomfort may be more severe and prolonged than typical angina.)

- A conservative estimate for the number of discharges with ACS from hospitals in 2006 is 733,000. Of these, an estimated 401,000 are male and 332,000 are female. This estimate is derived by adding the first-listed inpatient hospital discharges for MI (647,000) to those for UA (86,000). (*NHDS, NCHS*)

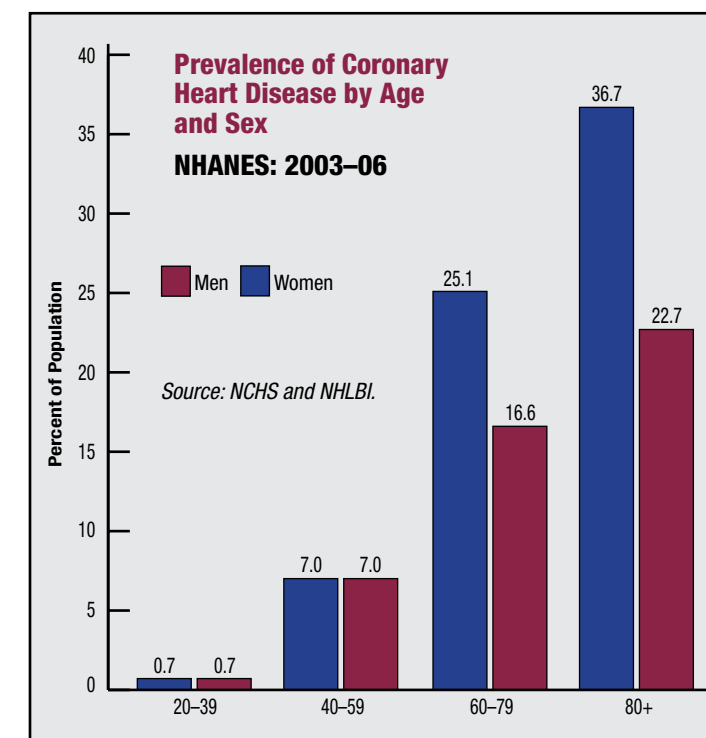
### Angina Pectoris (ICD/9 413) (ICD/10 I20)

### Incidence

- Only 18 percent of coronary attacks are preceded by longstanding 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.*)

### 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.





# 4 Stroke

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

## Prevalence

- Among adults age 20 and older, the estimated prevalence of stroke in 2006 was 6,400,000 (about 2,500,000 males and 3,900,000 females). (NHANES 2003-06, NCHS and NHLBI.)

## Incidence

- Each year about 795,000 people experience a new or recurrent stroke. About 610,000 of these are first attacks, and 185,000 are recurrent attacks. (GCNKSS, NINDS, NHLBI)
- On average, every 40 seconds someone in the United States has a stroke. (AHA computation based on latest available data.)
- Each year, about 55,000 more women than men have a stroke. (GCNKSS, NINDS)
- Men's stroke incidence rates are greater than women's at younger ages but not at older ages. The male/female incidence ratio 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 (NHLBI. Incidence and Prevalence: 2006 Chart Book on Cardiovascular and Lung Diseases.)
- The Brain Attack Surveillance in Corpus Christi project (BASIC/NINDS) clearly demonstrated an increased incidence of stroke among Mexican Americans compared with non-Hispanic whites. The crude cumulative incidence was 168/10,000 in Mexican Americans and 136/10,000 in non-Hispanic whites. Specifically, Mexican Americans have an increased incidence of intracerebral hemorrhage and subarachnoid hemorrhage compared with non-Hispanic whites, as well as an increased incidence of ischemic stroke and TIA at younger ages. (Am J Epidemiol. 2004;160:376-383.)
- Of all strokes, 87 percent are ischemic, 10 percent are intracerebral hemorrhage, and 3 percent are subarachnoid hemorrhage. (GCNKSS, NINDS)

## Mortality

Stroke accounted for about one of every 18 deaths in the United States in 2006. Stroke mortality for 2006 was 137,119 (54,524 males, 82,595 females). Stroke any mention mortality in 2006 was about 232,000 (see glossary for definition of "any mention mortality"). (NHLBI; NCHS public use data file.)

- 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 four minutes someone dies of a stroke. (NCHS, NHLBI)
- Among people ages 45-64, 8 to 12 percent of ischemic strokes and 37 to 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 1996-2006, the stroke death rate fell 33.5 percent and the actual number of stroke deaths declined 18.4 percent. (NCHS, CDC. Compressed Mortality File: Underlying Cause of Death; <http://wonder.cdc.gov/mortSQL.html>)
- The 2006 final death rate for stroke was 43.6 per 100,000. Death rates were 41.7 for white males and 67.1 for black males; 41.1 for white females and 57.0 for black females. (NCHS, CDC. Compressed Mortality File: Underlying Cause of Death; <http://wonder.cdc.gov/mortSQL.html>) Death rates were 35.9 for Hispanic or Latino males and 32.3 for females; 39.8 for Asian or Pacific Islander males and 34.9 for females; and 25.8 for American Indian/ Alaska Native males and 30.9 for females. (NCHS. Health, United States, 2007.)
- Because women live longer than men and stroke occurs at older ages, more women than men die of stroke each year. Women accounted for 60.6 percent of U.S. stroke deaths in 2006. (AHA computation based on latest mortality data.)

## Stroke Risk Factors

- The risk of ischemic stroke in current smokers is about double that of nonsmokers after adjustment for other risk factors. (FHS, CHS, HHP, NHLBI)
- Atrial fibrillation (AF) is an independent risk factor for stroke, increasing risk about five-fold. (Stroke. 1991;22:983-988.)

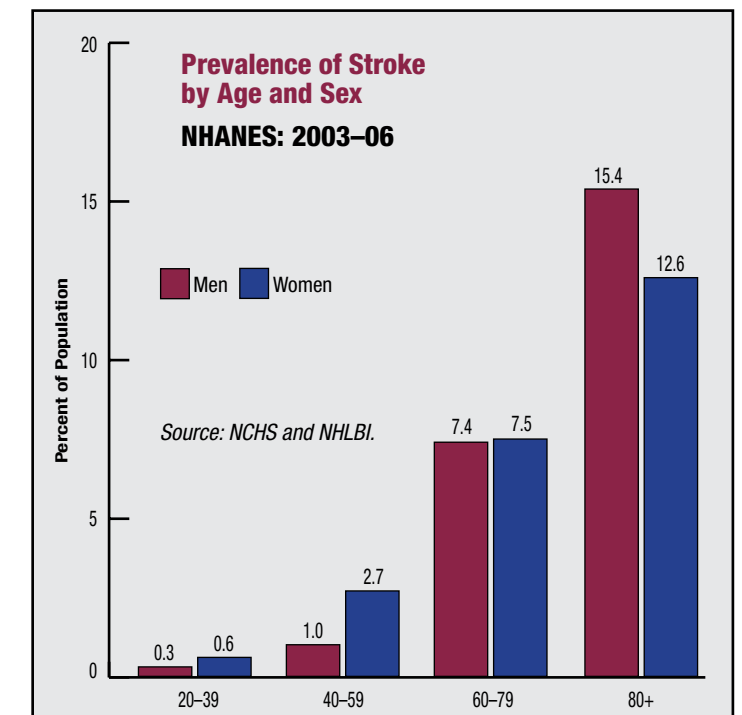
- High blood pressure is a powerful determinant of risk for both ischemic and intercranial hemorrhage. (Stroke. 1997;28:1840-1844.) Subjects with blood pressure lower than 120/80 mm Hg have about half the lifetime risk of stroke compared to subjects with high blood pressure. (Stroke. 1991;22: 983-88; JAMA. 2003; 290:1049-56.)
- A study of over 37,000 women age 45 and 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 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, the Women's Health Initiative primary prevention clinical trial found that estrogen plus progestin (PremPro) increased ischemic stroke risk by 44 percent, with no effect on hemorrhagic stroke. (JAMA. 2003;289:2673-2684.)
- Analysis of data from the Framingham Heart Study found that women with menopause before age 42 had twice the stroke risk compared with all other women in different age groups. (Stroke. 2009;40:1044-1049.)
- In the Framingham Heart Study, among participants younger than age 65, the risk of stroke/TIA was 4.2 times higher in subjects with symptoms of depression. (Stroke. 2007;38:16-21.)

## Physical Activity and Stroke Prevention

- 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 showed a decrease in total stroke risk in men who were highly physically active (RR = 0.82). (Stroke. 1999;30:1-6.)
- 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.)

## Awareness of Stroke Warning Signs and Risk Factors

- According to 2005 BRFSS data in 14 states, 38.1 percent of respondents were aware of five stroke warning signs and would first call 9-1-1 if they thought someone was having a heart attack or stroke. (MMWR Morb Mortal Wkly Rep. 2008;57:481-5.)
- Spanish-speaking Hispanics are less likely to know all stroke symptoms, and far less likely to know all heart attack symptoms, than English-speaking Hispanics, non-Hispanic blacks and non-Hispanic whites. (Am J Prev Med. 2006;30:189-196.)
- In the Reasons for Geographic and Racial Differences in Stroke Study (REGARDS/NINDS), black participants were more aware than whites of their hypertension and more likely to be undergoing treatment if aware of their diagnosis, but among those treated for hypertension, they were less likely than whites to have their blood pressure controlled. (Stroke. 2006;37:1171-8.)
- A study of patients who have had a stroke found that only 60.5 percent were able to identify one stroke risk factor and only 55.3 percent were able to identify one stroke warning sign. (Heart Lung. 2007;36:25-34.)



## Aftermath

- Stroke is a leading cause of serious, long-term disability in the United States. (*SIPP; MMWR Morb Mortal Wkly Rep. 2001;50:120-125.*)
  - Based on pooled data from the FHS, ARIC and CHS studies of the NHLBI: The percent who die one year following a first stroke:
    - 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.
- The median survival time (in years) following a first stroke is:
- at ages 60–69: 6.8 for men and 7.4 for women.
  - at ages 70–79: 5.4 for men and 6.4 for women.
  - at age 80 and older: 1.8 for men and 3.1 for women.
- After stroke, women have greater disability than men. A Michigan-based stroke registry found that 33 percent of women had moderate-to-severe disability at discharge compared with 27 percent of men. In an analysis of 108 stroke survivors from the Framingham Heart Study, 34 percent of women were disabled six months after their stroke compared to 16 percent of men. (*Stroke. 2003;34:1581-5; Stroke. 2007;38:2541-8.*)
  - Black stroke survivors report higher activity limitations than white survivors, according to data of the Centers for Disease Control and Prevention. (*MMWR Morb Mortal Wkly Rep. 2005;54:3-6.*)

## Hospital Discharges/ Ambulatory Care Visits

- From 1996–2006, the number of inpatient discharges from shortstay hospitals, with stroke as the first listed diagnosis declined from 956,000 to 889,000. This decrease was observed in adults age 65 and older. (*NHDS/NCHS.*)
- 2006 data from the Hospital Discharge Survey of the NCHS showed the average length of stay for discharges with stroke as the first listed diagnosis was 4.9 days. (*2006 National Hospital Discharge Survey. National Health Statistics Reports, No. 5.*)

## Cost

- The estimated direct and indirect cost of stroke for 2010 is \$73.7 billion.
- The mean lifetime cost of ischemic stroke in the United States is estimated at \$140,048. This includes inpatient care, rehabilitation and follow-up care necessary for lasting deficits. (All numbers converted to 1999 dollars using the medical component of CPI.) (*Stroke. 1996;27:1459-1466.*)

## Stroke in Children

- According to the National Center for Health Statistics, from 1990 to 1998, the rate of stroke in infants less than 30 days of age (per 100,000 births) was 26.4. (*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 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. Stroke mortality in children younger than age 1 has remained the same over the last 40 years. (*Neurology. 2006;67:1390-95.*)

## Transient Ischemic Attack (TIA)

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

- The prevalence of transient ischemic attacks (TIA) increases with age. (*Cerebrovasc Dis. 1996;6[suppl 1]:26-33.*)
- About 15 percent of strokes are preceded by a TIA. (*Cerebrovasc Dis. 1996;6[suppl 1]:26-33.*)
- About half of patients who experience a TIA fail to report it to their healthcare providers. (*Neurology. 2003;60:1429-1434.*)
- After TIA, the 90-day risk of stroke is 3 to 17.3 percent, highest within the first 30 days. (*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:S20-S21, Stroke. 2005;36:720-3.*)
- People who have a TIA have a 10-year stroke risk of 18.8 percent. (*J Neurol Neurosurg Psychiatry. 2003;74:577-80.*)

# High Blood Pressure (and End-Stage Renal Disease)

# 5

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

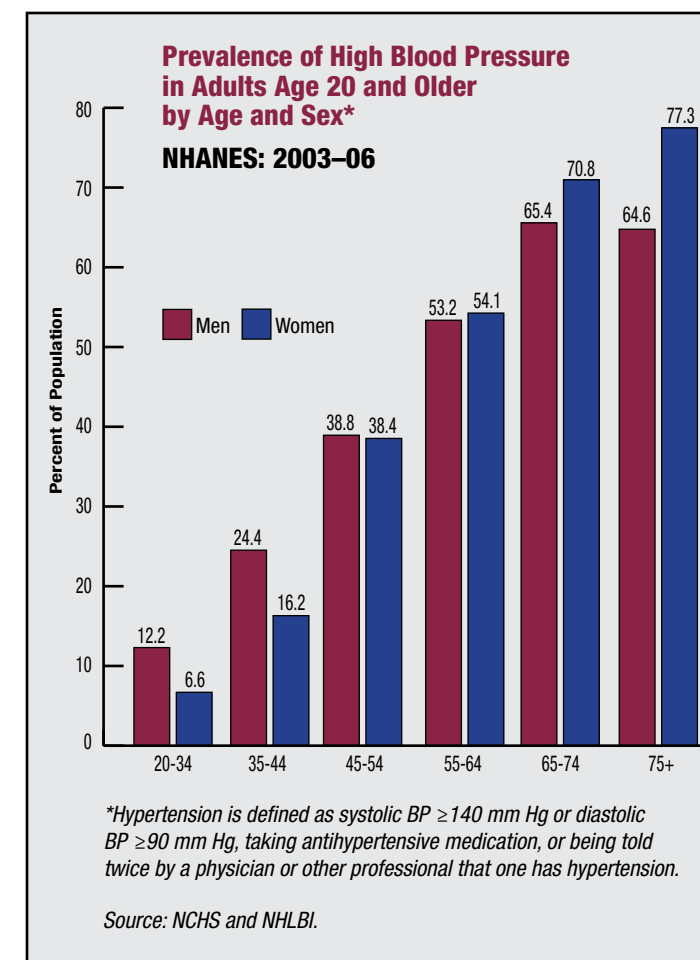
## Prevalence

- The estimated 2006 prevalence for high blood pressure (HBP) was 74,500,000 (35,700,000 males, 38,800,000 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. (*NCHS/NHLBI. NHANES 2003-06.*)
- 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 and 55–64, the percentage of men and women is similar. After that, a much higher percentage of women have HBP than men. (*Health, United States, 2007.*)
- The prevalence of diagnosed and undiagnosed hypertension (from 1999 to 2002) was 78 percent for older women and 64 percent for older men. (*NHANES/NCHS, 2007.*)
- 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.*)
- According to the 2007 BRFSS study, the percentage of adults age 18 and older who had been told they had HBP ranged from 19.7 percent in Utah to 33.8 percent in Tennessee. The median percentage was 27.8 percent. (*cdc.gov/brfss/index.htm*)

## Race/Ethnicity and HBP

- The prevalence of HBP 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 increased from 35.8 percent to 41.4 percent among black adults, and it was particularly high among black women (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*)

- Among blacks, rates of high blood pressure vary substantially. Those with the highest rates are more likely to be middle-aged or older, less educated, overweight or obese, physically inactive, and to have diabetes. (*Arch Intern Med. 2005;165:2098-2104; Prev Med. 2002;35:303-312.*)
- Some studies suggest that Hispanic Americans have rates of HBP that are similar to or lower than those of non-Hispanic white Americans. According to NHIS surveys of 2000 to 2002, black Hispanics were at slightly greater risk of HBP than white Hispanics. (*Arch Intern Med. 2002;162:2565-71.*)
- According to a CDC analysis of death certificate data from 1995 to 2002, among Hispanics, Puerto Rican Americans had the highest hypertension-related death rate among all Hispanic subpopulations (154.0) and Cuban Americans had the lowest (82.5). (*MMWR Morb Mortal Wkly Rep. 2006;55:177-180.*)



## Mortality

In 2006, HBP mortality was 56,561 (24,382 males, 32,179 females). HBP any mention mortality in 2006 was about 326,000 (see glossary for definition of “any mention mortality”). (NCHS and NHLBI)

- From 1996 to 2006, the age-adjusted death rate from HBP increased 19.5 percent and the actual number of deaths rose 48.1 percent. (NCHS and NHLBI)
- The 2006 overall death rate from HBP was 17.8. Death rates were 15.6 for white males, 51.1 for black males, 14.3 for white females and 37.7 for black females. (NCHS Compressed Mortality File: underlying causes of death, 1979 to 2006; <http://wonder.cdc.gov/mortSQL.html>)

## Aftermath

- About 69 percent of people who have a first heart attack, 77 percent who have a first stroke, and 74 percent with congestive heart failure have blood pressure higher than 140/90 mm Hg. (NHLBI unpublished estimates from ARIC, CHS and FHS Cohort and Offspring Studies.)
- Data from the NHLBI’s Framingham Heart Study indicate that HBP is associated with shorter overall life expectancy as well as shorter life expectancy free of cardiovascular disease (CVD) and more years lived with CVD. At age 50, total life expectancy is 5.1 years longer for men with normal blood pressure, and 4.9 years longer for women with normal blood pressure, than in those with hypertension. (Hypertension. 2005;46:280–286.)

## Awareness and Control

- Data from NHANES 2003–06 showed that of those with hypertension age 20 and older, 77.6 percent were aware of their condition, 67.9 percent were under current treatment, 44.1 percent had it under control and 55.9 percent did not have it controlled. (NCHS and NHLBI)
- Analysis of NHANES/NCHS data from 1999–2004 through 2005–06 revealed substantial increases in awareness and treatment of hypertension. Control rates increased in both sexes, non-Hispanic blacks and Mexican Americans. (NCHS. Hypertension Awareness, Treatment and Control: Continued Disparities in Adults, United States, 2005–06. NCHS Data Brief No. 3, 2008.)
- According to 2005–06 data from NCHS, blood pressure control rates were lower among Mexican Americans (35.2 percent) than non-Hispanic Whites (46.1 percent) and non-Hispanic blacks (46.5 percent). (NCHS Data Brief No. 3; 2008.)

## Cost

- The estimated direct and indirect cost of HBP for 2010 is \$76.6 billion.

## Prehypertension

- “Prehypertension” 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.
- Based on NHANES 2005–06 data, it is estimated that about 25 percent of the U.S. population age 20 and older has prehypertension, including 32,400,000 men and 21,200,000 women. Other published sources give a higher estimate – 37 percent – based on different study inclusion criteria. (NCHS. Hypertension Awareness, Treatment and Control: Continued Disparities in Adults, United States, 2005–06. NCHS Data Brief No. 3, 2008.)
- In a study of NHANES 1999–2000, people with prehypertension were 1.65 times more likely to have above-normal cholesterol levels, overweight/obesity or diabetes, than those with normal blood pressure levels. (Arch Intern Med. 2004;164:2113–2118.)

## 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 and/or high blood pressure, and occurs when the kidneys can no longer function normally on their own.

- According to the U.S. Renal Data System, the 2006 prevalence of ESRD was 506,256. (U.S. Renal Data System. 2008 Annual Data Report: Atlas of Chronic Kidney Disease and End-Stage Renal Disease in the United States.)
- According to data from the U.S. Renal Data System, in 2006:
  - 110,854 new cases of ESRD were reported.
  - 87,654 patients died from ESRD.
  - More than 18,000 kidney transplantations were performed.
- According to estimates of the U.S. Renal Data System, by 2020, more than 700,000 Americans will have ESRD or a requirement for chronic dialysis or kidney transplantation. (J Am Soc Nephrol. 2005;16:3736–3741.)
- Diabetes is the most common cause of ESRD, followed by hypertension and glomerulonephritis. From 1994 to 2004, these three conditions accounted for 80 percent of all cases of ESRD. (MMWR Morb Mortal Wkly Rep. 2007;56:253–256.)
- CVD is the leading cause of death for those with ESRD, and CVD mortality is five to 30 times higher in dialysis patients than in subjects from the general population. (Circulation. 2003;108:2154–2169; Am J Kidney Dis. 2006;48:392–401.)
- As of 2005, the total annual cost of treating ESRD in the United States was about \$33 billion. (MMWR Morb Mortal Wkly Rep. 2008;57:309–12.)

# Congenital Cardiovascular Defects

# 6

(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.

## Prevalence

- As of 2002, the prevalence of congenital cardiovascular disease in adults in the United States was estimated to range from 650,000 to 1.3 million. (Am Heart J. 2004;147:425–439.)
- From 1940 to 2002, about 2 million patients with congenital cardiovascular defects were born in the United States. (Am Heart J. 2004;147:425–439.)
- Currently, no measured data are available to estimate the prevalence of congenital cardiovascular defects in U.S. adults.

## Incidence

- Nine defects per 1,000 live births, or 36,000 infants, are expected per year in the United States. (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

- In 2006, mortality from congenital cardiovascular defects was 3,531. In 2006, any mention mortality (see glossary for definition of “any mention mortality”) from congenital cardiovascular defects was 6,883.
- Congenital cardiovascular defects are the most common cause of infant death from birth defects; more than 29 percent of infants who die from a birth defect have a heart defect. (NVSS Final Data for 2005.)
- The 2006 death rate for congenital cardiovascular defects was 1.2. Death rates were 1.3 for white males, 1.3 for black males, 1.0

for white females and 1.7 for black females. Crude infant death rates (under 1 year) were 36.5 for white infants and 52.5 for black infants. (Centers for Disease Control and Prevention. Compressed Mortality File: Underlying Cause of Death, 1979–2006; <http://wonder.cdc.gov/mortSQL.html>)

- In 2005, 192,000 life-years were lost before age 55 due to deaths from congenital cardiovascular defects. This is more than the life years lost from leukemia, prostate cancer and Alzheimer’s disease combined. (Centers for Disease Control and Prevention. Compressed Mortality File: Underlying Cause of Death, 1979–2005; <http://wonder.cdc.gov/mortSQL.html>)
- From 1996–2006, death rates for congenital cardiovascular defects declined 33.3 percent, while the actual number of deaths declined 26.7 percent. (Centers for Disease Control and Prevention. Compressed Mortality File: Underlying Cause of Death, 1979–2006; <http://wonder.cdc.gov/mortSQL.html>)

## Congenital Cardiovascular Defects

Population Group	Estimated Prevalence All Ages	Mortality 2006	Hospital Discharges 2006 All Ages
Both sexes	650,000 to 1.3 million	3,531	70,000
Males	–	1,951 (55.3%)*	30,000
Females	–	1,580 (44.7%)*	40,000
White males	–	1,510	–
White females	–	1,216	–
Black males	–	356	–
Black females	–	296	–

Note: (–) = data not available.  
\*These percentages represent the portion of total congenital cardiovascular mortality that is for males vs females.  
Sources: Mortality: NCHS (these data represent underlying cause of death only; data for white and black males and females include Hispanics). Hospital discharges: NHDS, NCHS; data include inpatients discharged alive, dead, or status unknown.

## Hospitalizations/Cost

- In 2004, hospital costs for these conditions were \$2.6 billion. (Healthcare Cost and Utilization Project [HCUP] Statistical Brief #24: Hospitalizations for Birth Defects, 2004. Rockville, Md.: Agency for Healthcare Research and Quality, 2007.)
- According to 2003 data from the Healthcare Cost and Utilization Project 2003 Kids’ Inpatient Database, the most expensive average neonatal hospital charges were for hypoplastic left heart (\$199,597) and common truncus arteriosus (\$192,781). Coarctation of the aorta and transposition of the great arteries were also associated with costs above \$150,000. (MMWR Morb Mortal Wkly Rep. 2007;56:25–29.)

# 7 Heart Failure

(ICD/9 428) (ICD/10 I50)

## Prevalence

- The estimated 2006 prevalence of heart failure (HF) in adults age 20 and older: 5,800,000 (3,100,000 males, 2,700,000 females). (NHANES 2003–06, NCHS and NHLBI.)

## Incidence

- Data from the NHLBI's Framingham Heart Study indicate that (Circulation. 2002;106:3068–3072). . .
  - Heart failure (HF) incidence approaches 10 per 1,000 population after age 65.
  - Seventy-five percent of HF cases have antecedent hypertension.
  - At age 40, the lifetime risk of developing HF for both men and women is one in five.
  - At age 40, the lifetime risk of HF occurring without antecedent heart attack is one in nine for men and one in six for women.
  - The lifetime risk doubles for people with blood pressure (BP) greater than 160/90 mm Hg compared to those with BP less than 140/90 mm Hg.
- A 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.)
- The annual rates per 1,000 population of new HF events for white men are 15.2 for those 65 to 74 years of age, 31.7 for those 75 to 84 years of age, and 65.2 for those 85 years of age and older. For white women in the same age groups, the rates are 8.2, 19.8, and 45.6, respectively. For black men, the rates are 16.9, 25.5, and 50.6,\* and for black women, the estimated rates are 14.2, 25.5, and 44.0,\* respectively. (\*Estimate may be unreliable.) (CHS, NHLBI)

## Risk Factors

- Data from the Framingham Heart Study indicate that hypertension is a very common risk factor for HF that has contributed to a large proportion of heart failure cases among the study's participants, followed closely by antecedent MI. (JAMA. 1996;275:1557–1562.)
- A study of the predictors of HF among postmenopausal 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 for those diagnosed 20 years earlier. (Am J Med. 2006;119:591–599.)

## Mortality

In 2006, HF any mention mortality was 282,754 (see glossary for definition of “any mention mortality”). HF was listed as the underlying cause (see glossary for definition of “underlying cause”) in 60,337 of those deaths. (NCHS and NHLBI)

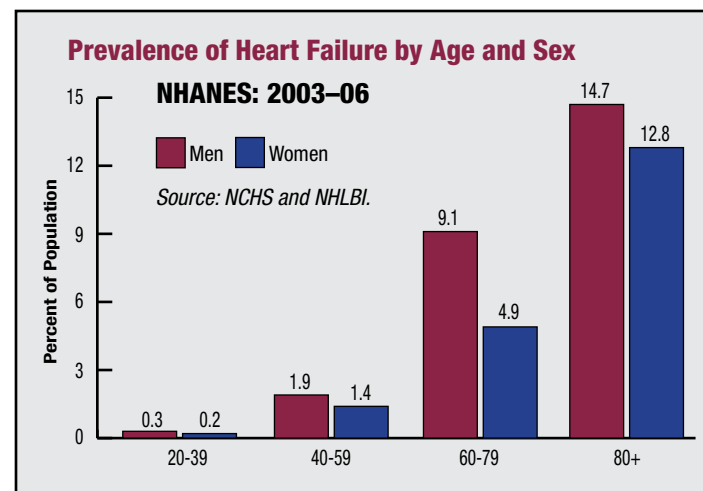
- Based on follow-up of the NHLBI's Framingham Heart Study original and offspring cohort:
  - The one-year mortality rate for HF is high, with one in five dying.
  - After HF is diagnosed, survival is poorer in men than in women: 59 percent of men and 45 percent of women will die within five years.
- The 2006 overall any mention death rate for HF was 89.2 per 100,000 population. Any mention death rates were 103.7 for white males, 105.9 for black males, 80.3 for white females and 84.4 for black females. (NCHS and NHLBI)

## Hospital Discharges

- Hospital discharges for HF rose from 877,000 in 1996 to 1,106,000 in 2006. (NHDS 2006, NCHS.)

## Cost

- The estimated direct and indirect cost of HF in the United States for 2010 is \$39.2 billion.



# Peripheral Arterial Disease (PAD)

# 8

**Peripheral arterial disease (PAD)** affects about 8 million Americans and is associated with significant morbidity and mortality. (JAMA. 2001;286:1317–1324.)

- PAD prevalence increases dramatically with age and disproportionately affects blacks. (Circulation. 2004;110:738–743.)
- Most studies suggest that PAD prevalence is similar between men and women. (J Vasc Surg. 2007; Suppl S:S5–S67.)
- PAD affects 12 to 20 percent of Americans age 65 and older. (J Am Geriatr Soc. 2007;55:583–589.) Despite its prevalence and cardiovascular risk implications, only 20 to 30 percent of PAD patients are undergoing treatment. (JAMA. 2006;295:180–189.)
- In the general population, only about 10 percent of persons with PAD have the classic symptom 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; JAMA. 2001;286:1599–1606.) 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 but not identical to those for coronary heart disease, although diabetes and cigarette smoking are particularly strong risk factors for PAD. (Circulation. 2006 Mar 21;113(11):e463–654.)

- 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.)
- High blood levels of lead and cadmium may increase the risk of PAD, according to data from the NHANES 1999–2000 of the NCHS. 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.)
- The prevalence of PAD in persons of Hispanic origin is similar to or slightly higher than in Caucasians, according to available evidence. (Circulation. 2005;112:2703–2707; Am J Prev Med. 2007;32:328–333.)
- Among patients with PAD, higher levels of daily physical activity are associated with better overall survival, a lower risk of death from cardiovascular disease and slower rates of functional decline. (Circulation. 2006;114:242–248; Circulation. 2009;119:251–256.)
- In a telephone survey of more than 2,500 adults age 50 and older, 26 percent of respondents said they were familiar with PAD. Of these respondents, half were not aware that diabetes and smoking increase the risk of PAD. One in four knew that PAD is associated with increased risk of heart attack and stroke. Awareness levels were lower in respondents with lower income and education levels. (Circulation. 2007;116:2086–2094.)

## Physical Inactivity

## Prevalence

## Youth

- According to the 2007 YRBS survey of students in grades 9–12, 31.8 percent of females and 18 percent of males did not engage in 60 minutes of moderate-to-vigorous physical activity even once in the previous seven days (despite recommendations that children do so daily). (*MMWR Surveill Summ. 2008; 57:1- 131.*)
  - Rates of inactivity were highest among black (42.1 percent) and Hispanic (35.2 percent) females, compared with white females (28.2 percent).
- 61.5 percent of children ages 9–13 don't participate in any organized physical activity during their nonschool hours, and 22.6 percent don't engage in any free-time physical activity, 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;52:785–8.*)
- 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;347:709–15.*)
  - 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 BMI is associated with greater decline in activity among girls of both races.
- According to the 2007 YRBS survey of students in grades 9–12, more than one-fourth of all students spent three or more hours per day using computers outside of school time (24.9 percent) or watching television (35.4 percent). In the same survey, 34.7 percent said they met current recommendations for physical activity (43.7 percent of males and 25.6 percent of females). (*MMWR Surveill Summ. 2008;57:1–131.*)

## Adults

- The 2008 prevalence of regular leisure-time physical activity among adults age 18 and older is 32.5 percent (males, 34.8 percent; females, 30.6 percent). (*National Health Interview Survey, 2008.*)
- According to 2007 BRFSS/CDC data, 64.5 percent of adults age 18 and older (68.9 percent of men and 60.4 percent of women) engage in 30 or more minutes of moderate physical activity five or more days per week, or engage in more than 20 minutes of vigorous physical activity three or more days per week. (*Behavioral Risk Factor Surveillance System. Prevalence and trends data, physical activity, 2007.*)
- In 2005, 10.3 percent of adults reported no vigorous-to-moderate physical activity in leisure time, as part of their job or for transportation. (*Barnes P, Centers for Disease Control and Prevention. Physical activity among adults: United States, 2000 and 2005.*)

## Physical Activity and Coronary Heart Prevention

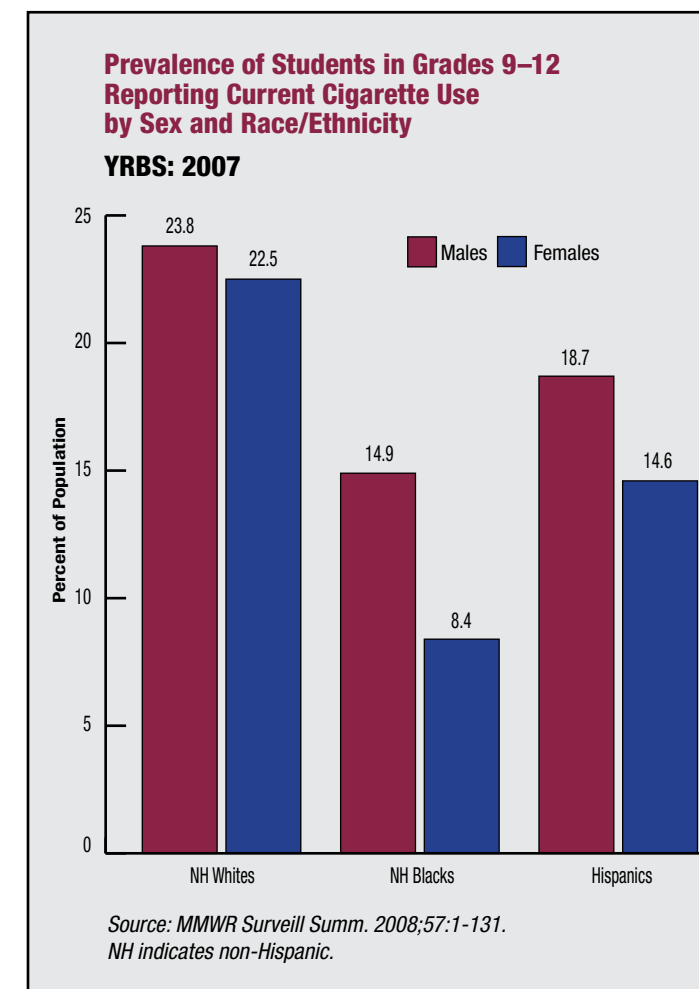
- The relative risk of coronary heart disease associated with physical inactivity ranges from 1.5–2.4, an increase in risk comparable to that observed for high blood cholesterol, high blood pressure or cigarette smoking. (*JAMA. 1995;273:402–407.*)
- A study of over 72,000 female nurses indicates that moderate-intensity physical activity, such as walking, is associated with a substantial reduction in risk of total and ischemic stroke. (*JAMA. 2000;283:2961–2967.*)
- Physical inactivity is responsible for 12.2 percent of the global burden of heart attack after accounting for other cardiovascular risk factors. (*Lancet. 2004;364:937–52.*)States, 2007.)

## Smoking

## Prevalence

## Youth

- In 2007, in grades 9–12, 21.3 percent of male students and 18.7 percent of female students reported current tobacco use, 19.4 percent of males and 7.6 percent of females reported current cigar use, and 13.4 percent of males and 2.3 percent of females reported current smokeless tobacco use. (*MMWR Surveill Summ. 2008;57:1–131.*)
- From 1980 to 2007, the percentage of high school seniors who smoked in the past month decreased 29.2 percent. This percentage decreased by 13.8 percent in males, 41.3 percent in females, 18.7 percent in whites and 57.9 percent in blacks. (*NCHS; Health, United States, 2008.*)
- Among youths ages 12–17 in 2007, 3.1 million (12.4 percent) used a tobacco product in the past month, and 2.5 million (9.8 percent) used cigarettes. The rate of cigarette use in the past month declined from 13.0 percent in 2002 to 9.8 percent in 2007. (*Results from the 2007 National Survey on Drug Use and Health: National Findings. Rockville, Md.: Substance Abuse and Mental Health Services Administration, 2008.*)



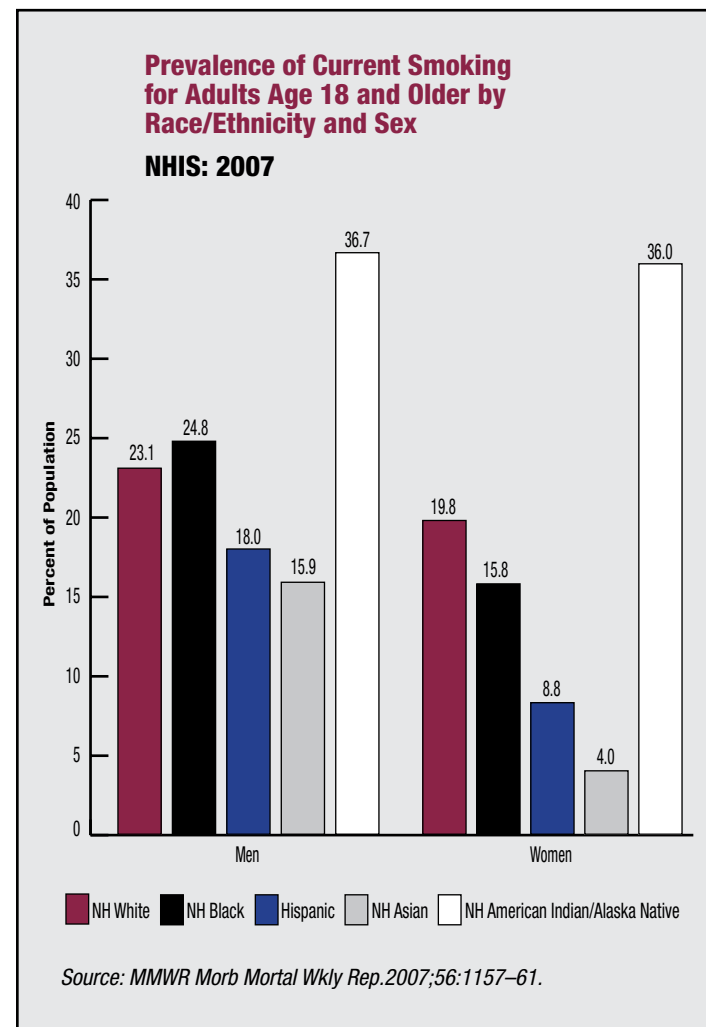
- Results from the 2008 Monitoring the Future survey of the NIH showed a considerable drop in “ever use” of cigarettes among eighth graders. From 1991 to 2008, it dropped from 44 percent to 20.5 percent. (*National Institute on Drug Abuse. Monitoring the Future Study, 2009.*)
- Data from the YRBS among high school students indicate that (*YRBS: National Trends in Risk Behaviors; www.cdc.gov/HealthyYouth/yrebs/trends.htm*):
  - The percentage of students ever trying cigarettes declined from 70.4 percent in 1999 to 50.3 percent in 2007.
  - The percentage who smoked in the prior 30 days declined from 36.4 percent in 1997 to 20 percent in 2007.
  - The percentage who smoked on at least 20 of the prior 30 days declined from 16.8 percent in 1999 to 8.1 percent in 2007.
  - The percentage of current tobacco users (cigarettes, cigars, smokeless tobacco) declined from 43.5 percent in 1997 to 25.7 percent in 2007.

## Adults

- In 2008, the prevalence for smoking (age 18+) was 46,000,000 (24,800,000 males; 21,100,000 females). This represents 20.6 percent of the adult population. (*NCHS*)
- From 1965 to 2007, smoking in the United States declined by 50.4 percent among people age 18 and older. (*NCHS*)
- In 2008, among Americans age 18 and older, 23.1 percent of men and 18.3 percent of women were cigarette smokers, putting them at increased risk of heart attack and stroke. (*National Health Interview Survey, 2008.*)
- Use of any tobacco product in 2006 by people age 12 and older was 31.4 percent for non-Hispanic whites only, 29.1 percent for non-Hispanic blacks only, 42.3 percent for non-Hispanic American Indians or Alaska Natives only, 16.0 percent for non-Hispanic Asians only and 24.4 percent for Hispanics or Latinos of any race. (*Health, United States, 2008.*)
- BRFSS/CDC 2008 data showed that among adults age 18 and older, the median percentage of current smokers among the states was 18.3 percent. The highest percentage was in West Virginia (26.5 percent), and the lowest was in Utah (9.3 percent). (*Centers for Disease Control and Prevention. Prevalence and trends data, tobacco use. Behavioral Risk Factor Surveillance System Survey, 2009.*)
- Incidence
  - In 2007, about 2.2 million people age 12 or older smoked cigarettes for the first time. This averages out to about 6,100 new smokers every day. Most new smokers (59.7 percent) were under age 18 when they first smoked cigarettes. (*Results from the 2007 National Survey on Drug Use and Health: National Findings. Rockville, Md.: Substance Abuse and Mental Health Services Administration, 2008.*)
  - Data from 2002 to 2004 suggest that about one in five nonsmokers ages 12 to 17 is likely to start smoking. (*MMWR Morb Mortal Wkly Rep. 2006;55:1275-1277.*)

## Mortality

- From 2000 to 2004, cigarette smoking resulted in an estimated 443,000 premature deaths each year from smoking-related illnesses, and about 49,000 of those deaths was from secondhand smoke. (*MMWR Morb Mortal Wkly Rep. 2008;57:1226–1228.*)
- 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/tobacco/sgr/sgr\_2004/index.htm*)
- Each year from 2000 to 2004, smoking caused 3.1 million years of potential life lost for men and 2.0 million years for women; smoking during pregnancy resulted in an estimated 776 infant deaths annually. (*MMWR Morb Mortal Wkly Rep. 2008;57:1226–1228.*)
- Cigarette smoking results in a two-to-three-fold risk of dying from CHD. (*Tobacco-Related Mortality, Fact Sheet. www.cdc.gov/tobacco.*)



## Secondhand Smoke

- Data from The Health Consequences of Involuntary Exposure to Tobacco Smoke: A Report of the Surgeon General (2006) indicate:
  - Nonsmokers exposed to secondhand smoke at home or at work increase their risk of heart disease by 25 to 30 percent.
  - Almost 60 percent of children ages 3–11 (almost 22 million) are exposed to secondhand smoke.
  - Short exposures to secondhand smoke can cause blood platelets to become stickier, damage the lining of the blood vessels and decrease coronary flow velocity, potentially increasing the risk of heart attack.

## Aftermath

- Information from the “CDC Health Effects of Cigarette Smoking Fact Sheet” (Updated January 2008):
  - Cigarette smokers are two to four times more likely to develop coronary heart disease 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 (\$96 billion) and lost productivity costs associated with smoking (\$97 billion) total an estimated \$193 billion per year. (*CDC. Smoking and tobacco use: fast facts.*)
- Healthcare costs associated with exposure to secondhand smoke average \$10 billion annually. (*CDC. Smoking and tobacco use: fast facts.*)

## High Blood Cholesterol and Other Lipids

### Prevalence

#### Youth

- Among children ages 4 to 11, the mean total blood cholesterol level is 165.1 mg/dL. For boys, it is 164.6 mg/dL; for girls, it is 165.6 mg/dL. (*NHANES 2003–06*)
- Among adolescents ages 12 to 19, the mean total blood cholesterol level is 161.1 mg/dL. For boys, it is 157.5 mg/dL; for girls, it is 164.8 mg/dL. (*NHANES 2003–06*)
- About 10.2 percent of adolescents ages 12–19 have total cholesterol levels exceeding 200 mg/dL. (*NHANES 2003–06*)

#### Adults

- The 2006 prevalence of total cholesterol (in adults age 20 and older) at or above 200 mg/dL was 102,200,000 (47,700,000 males; 54,500,000 females). This represents about 46.8 percent of the adult population. (*NHANES 2003–06*)
- The 2006 prevalence of total cholesterol (in adults age 20 and older) at or above 240 mg/dL was 35,700,000 (15,900,000 males; 19,700,000 females). This represents about 16.2 percent of the adult population. (*NHANES 2003–06*)
- According to data from NHANES 2005–06, between 1999–2000 and 2005–06, mean serum total cholesterol levels in adults age 20 and older declined from 204 mg/dL to 199 mg/dL. (*NCHS Data Brief No. 2. December 2007.*)
- 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]:750–5.*)
- 2007 data from the BRFSS survey showed that overall, 37.6 percent (median) of adults had been told that they had high blood cholesterol. The highest percentage was in West Virginia (42.4 percent) and the lowest was in Minnesota (32.4 percent). (*www.cdc.gov/brfss/*)

### 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 coronary heart disease (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 Levels

### Youth

- Among adolescents ages 12–19, the mean LDL cholesterol level is 89.2 mg/dL. For boys, it is 87.5 mg/dL and for girls, it is 90.9 mg/dL. (*NHANES 2003–06*)

### Adults

- The 2006 prevalence (in adults age 20 and older) of LDL cholesterol 130 mg/dL or higher was 71,200,000 (34,900,000 males; 36,300,000 females). This represents about 32.6 percent of the adult population. (*NHANES 2003–06*)
- The mean level of LDL cholesterol for American adults age 20 and older is 115 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. (*NHANES 2003–06*)

## HDL (Good) Cholesterol Levels

### Youth

- Among children and adolescents ages 4–11, the mean HDL cholesterol level is 55.7 mg/dL. For boys, it is 56.7 mg/dL and for girls, it is 54.7 mg/dL. (*NHANES 2003–06*)
- Among adolescents ages 12–19, the mean HDL cholesterol level is 52.4 mg/dL. For boys, it is 49.4 mg/dL and for girls, it is 55.6 mg/dL. (*NHANES 2003–06*)

### Adults

- The 2006 prevalence (in adults age 20 and older) of HDL cholesterol less than 40 mg/dL was 35,100,000 (26,400,000 males; 8,700,000 females). This represents about 16.2 percent of the adult population. (*NHANES 2003–06*)
- The mean level of HDL cholesterol for American adults age 20 and older is 54.3 mg/dL. (*NHANES 2003–06*)

## Triglyceride Levels

### Youth

- Among adolescents ages 12–19, the mean triglyceride level is 92.4 mg/dL. For boys it is 92.4 mg/dL and for girls it is 92.4 mg/dL. (*NHANES 2003–06*)

### Adults

- The mean triglyceride level for American adults age 18 and older is 144.2 mg/dL (men, 156.5 mg/dL; women, 132.1 mg/dL). (*NHANES 2003–06*)

# Overweight and Obesity

## Prevalence

### Youth

- Nearly 10 million children and adolescents ages 6–19 are considered overweight, based on the 95th percentile or higher of BMI-for-age values in the 2000 CDC growth chart for the United States. (NHANES [2003–06], NCHS)
- Based on data from NHANES, the prevalence of overweight (BMI at or above the 95th percentile of the CDC growth charts) in children ages 6–11 increased from 4.0 percent in 1971–74 to 17.0 percent in 2003–06. The prevalence of overweight in adolescents ages 12–19 increased from 6.1 percent to 17.6 percent. (Health, United States, 2008, NCHS; JAMA. 2008;299:2401–5.)
- In 2003–06, just over 12 percent of preschool children ages 2–5 were overweight. (JAMA. 2008;299:2401–5.)
  - Among preschool children, the following were overweight: 10.7 percent of non-Hispanic whites, 14.9 percent of non-Hispanic blacks and 16.7 percent of Mexican Americans.
  - Among children ages 6–11, the following are overweight: 15.0 percent of non-Hispanic whites, 21.3 percent of non-Hispanic blacks and 23.8 percent of Mexican Americans.
  - Among adolescents ages 12–19, the following are overweight: 16.0 percent of non-Hispanic whites, 22.9 percent of non-Hispanic blacks and 21.1 percent of Mexican Americans.
- 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)
- Data from the CDC's YRBS 2007 survey showed that the prevalence of being overweight was higher among non-Hispanic black (19.0 percent) and Hispanic (18.1 percent) than non-Hispanic white (14.3 percent) high school students; higher among non-Hispanic black female (21.4 percent) and Hispanic female (17.9 percent) than non-Hispanic white female (12.8 percent) high school students; and higher among non-Hispanic black male (16.6 percent) and Hispanic male (18.3 percent) than non-Hispanic white male (15.7 percent) high school students. (CDC. YRBS Survey 2007.)
- On the basis of 2003 to 2006 data from NHANES (NCHS), the prevalence of overweight and obesity in children 2 to 5 years of age, based on a BMI-for-age value at or above the 85th percentile of the 2000 CDC growth charts, was 25.4% for non-Hispanic white boys and 20.9% for non-Hispanic white girls, 23.2% for non-Hispanic black boys and 26.4% for non-Hispanic black girls, and 32.4% for Mexican American boys and 27.3% for Mexican American girls. In children 6 to 11 years of age, the prevalence was 31.7% for non-Hispanic white boys and 31.5% for non-Hispanic white girls, 33.8% for non-Hispanic black boys and 40.1% for non-Hispanic black girls, and 47.1% for Mexican American boys and 38.1% for Mexican American girls. In children 12 to 19 years of age, the prevalence was 34.5% for non-Hispanic white boys and 31.7%

for non-Hispanic white girls, 32.1% for non-Hispanic black boys and 44.5% for non-Hispanic black girls, and 40.5% for Mexican American boys and 37.1% for Mexican American girls. (JAMA. 2008;299:2401–2405.)

### Adults

- In 2006, an estimated 144,100,000 U.S. adults (age 20 and older) were overweight or obese (75,500,000 males; 68,600,000 females.) This represents 66.3 percent of the adult population. (NHANES 2003–06.)
- In 2006, an estimated 71,600,000 U.S. adults (age 20 and older) were obese (33,600,000 males; 38,000,000 females). This represents about 32.9 percent of the adult population. (NHANES 2003–06.)
- According to 2008 data from the BRFSS/CDC survey based on self-reported height and weight, 26.6 percent (median) of adults were obese. The highest prevalence of obesity was in Mississippi (33.3 percent) and the lowest was in Colorado (19.1 percent). (BRFSS/CDC, 2008; MMWR Morb Mortal Wkly Rep. 2008;57:765–768.)
- The WHO estimates that by 2015, the number of overweight people worldwide will increase to 2.3 billion, and more than 700 million will be obese. In 2005, at least 20 million children worldwide under age 5 were overweight. (WHO. Obesity and Overweight. Fact Sheet No. 311. www.who.int/mediacentre/factsheets/fs311/en/print.html)

## Cost

- According to one study, annual medical spending on overweight and obesity could be as high as \$147 billion in 2008 dollars, which would represent almost 10 percent of U.S. health expenditures. (Health Aff [Millwood]. 2009;28:w822–w831.)

# Diabetes Mellitus

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

## Prevalence

### Youth

- About 186,000 people under age 20 have diabetes. Each year, about 15,000 people under 20 are diagnosed with type 1 diabetes. Healthcare providers are finding more and more children with type 2 diabetes, a disease usually diagnosed in adults age 40 and older. Children who develop type 2 diabetes are typically overweight or obese and have a family history of diabetes. Most are American Indian, black, Asian, or Hispanic/Latino. (Diabetes Care. 2009;32[Suppl 2]:5133–5140.)
- Among adolescents ages 10–19 diagnosed with diabetes, 57.8 percent of blacks were diagnosed with type 2 versus type 1 diabetes, compared with 46.1 percent of Hispanic and 14.9 percent of Caucasian youth. (JAMA. 2007;297:2716–24.)

## Adults

- The 2006 prevalence (among adults age 20 and older) of physician-diagnosed diabetes was 17,200,000 (7,900,000 males; 9,300,000 females). This represents about 7.7 percent of the adult population. (NHANES 2003–06.)
- The 2006 prevalence (among adults age 20 and older) of undiagnosed diabetes was 6,100,000 (3,800,000 males; 2,300,000 females). This represents about 2.8 percent of the adult population. (NHANES 2003–06.)
- The 2006 prevalence (among adults age 20 and older) of prediabetes was 63,200,000 (37,500,000 males; 25,700,000 females). This represents about 29.0 percent of the adult population. (NHANES 2003–06.)
- Based on projections from NHANES/NCHS studies between 1984 and 2004, the total prevalence of diabetes in the United States is expected to more than double from 2005 to 2050 (from 5.6 percent to 12.0 percent) in all age, sex and race/ethnicity groups. (Diabetes Care. 2006;29:2114–6.)
- 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 worldwide with diabetes is projected to rise from 171 million in 2000 to 366 million in 2030. (Diabetes Care. 2006;27:1047–53.)

- Type 2 diabetes accounts for 90 to 95 percent of all diagnosed cases of diabetes. (diabetes.niddk.nih.gov/dm/pubs/statistics/index.htm)

## Incidence

- Data from the FHS indicate a doubling in the incidence of diabetes over the past 30 years, and most dramatically during the 1990s. FHS participants who attended a routine examination in the 1970s, 1980s, or 1990s were followed up for the eight-year incidence of diabetes across decades for participants 40–55 years of age in each decade. The age-adjusted eight-year incidence rate of diabetes was 2.0 percent, 3.0 percent and 3.7 percent among women and 2.7 percent, 3.6 percent and 5.8 percent among men in the 1970s, 1980s, and 1990s, respectively. (Circulation. 2006;113:2914–2918.)
- In 2006, a total of 1,600,000 new cases of diabetes were diagnosed in people age 20 and older. (National Institute of Diabetes and Digestive and Kidney Diseases. National Diabetes Statistics Fact Sheet: General Information and National Estimates on Diabetes in the United States, 2007.)

## Mortality

- Diabetes mortality in 2006 was 72,449. Any mention mortality (see glossary for definition of “any mention mortality”) in 2006 was 231,000. (NCHS and NHLBI)

- The 2006 overall death rate from diabetes was 23.3. Death rates (per 100,000 persons) were 25.4 for white males, 49.7 for black males, 17.9 for white females and 41.6 for black females. (Deaths: final data for 2006. Natl Vital Stat Rep. 2009;57. Available at: http://www.cdc.gov/nchs/data/nvsr/nvsr57/nvsr57\_14.pdf.)
- At least 65 percent of people with diabetes mellitus die of some form of heart disease or stroke. (NIDDK/NIH)
- 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)

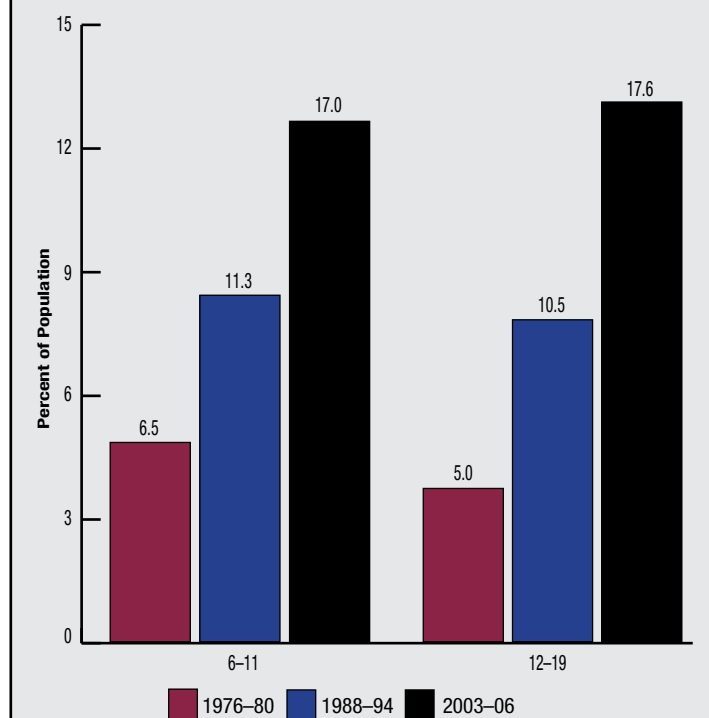
## Awareness

- The NIDDK estimates that 20.8 million Americans have diabetes and that about 30 percent are unaware they have it. (NIDDK. National Diabetes Statistics Fact Sheet: General Information and National Estimates on Diabetes in the United States, 2005.)

## Cost

- In 2007, the direct (\$116 billion) and indirect (\$58 billion) cost attributable to diabetes was \$174 billion. (NIDDK. National Diabetes Statistics, 2007 Fact Sheet.)

**Trends in Prevalence of Overweight Among U.S. Children and Adolescents by Age and Survey**  
NHANES: 1976–80, 1988–94 and 2003–06



Source: Health, United States, 2008: With Special Focus on Young Adults. (NCHS)

- The term “metabolic syndrome” refers to a cluster of risk factors associated with cardiovascular disease (CVD) and type 2 diabetes. Several different definitions for metabolic syndrome (MetS) are in use; in the United States, the National Cholesterol Education Program’s (NCEP) ATP III definition and its two subsequent revisions have been the most commonly used. By this definition, 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 or undergoing treatment for elevated glucose
  - HDL cholesterol below 40 mg/dL in men or below 50 mg/dL in women or undergoing treatment for reduced HDL cholesterol
  - Triglycerides of 150 mg/dL or higher or undergoing treatment for elevated triglycerides
  - 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, or antihypertensive drug treatment in a patient with a history of hypertension
- Based on NHANES 2003–06 data, about 34 percent of adults age 20 and older met the criteria for MetS (35.1 percent for men and 32.6 percent for women). (*NCHS/NHSR No. 13*)
- Based on NHANES 1999–2002 data, the prevalence of MetS in adolescents ages 12–19 was 9.4 percent, representing about 2.9 million persons. The prevalence was 13.2 percent in males and 5.3 percent in females; 10.7 percent in whites, 5.2 percent in blacks and 11.1 percent in Mexican Americans. (*J Pediatr*. 2008;152:165–70.)
- Among overweight or obese adolescents (based on NHANES 1999–2002 data), 44 percent had MetS. (*J Pediatr*. 2008;152:165–70.)

## Food and Nutrition

### Adults

#### According to data from NHANES 2005–06:

- Average consumption of whole grains by white and black men and women was between 0.5 and 0.7 servings per day, with only 3 to 5 percent of white and black adults consuming three or more servings per day. Average whole grain consumption by Mexican Americans was about two servings per day, with 22 to 28 percent consuming three or more servings per day.
- Average fruit consumption ranged from 1.1 to 1.8 servings per day among white, black and Mexican-American adults. Eight to 11 percent of whites, 6 to 9 percent of blacks and 6 to 10 percent of Mexican-American adults consumed four or more servings per day. When 100 percent fruit juices were included, servings consumed approximately doubled.
- Average vegetable consumption ranged from 1.2 to 2.1 servings per day. Eleven to 14 percent of whites, 5 to 10 percent of blacks and 3 to 5 percent of Mexican American adults consumed five or more servings per day. Including vegetable juices and sauces had little effect on these consumption patterns.
- Average consumption of nuts, legumes and seeds was about two servings per week among black women, black men and white women, three servings per week among white men, and six and eight servings per week among Mexican-American women and men, respectively. About 18 percent of whites, 14 to 17 percent of blacks and 38 to 46 percent of Mexican Americans consumed four or more servings per week.
- Average consumption of processed meats was lowest among Mexican-American women (1.5 servings per week) and highest among black men (3.7 servings per week). Between 40 percent (Mexican-American women) and 68 percent (black men) of adults consumed one or more servings per week.
- Average consumption of sugar-sweetened beverages ranges from about six servings per week among white women to 18 servings per week among Mexican-American men. About 51 and 32 percent of white men and women, 76 and 66 percent of black men and women, and 78 and 61 percent of Mexican-American men and women, respectively, consumed 36 or more ounces (4.5 eight-ounce servings) per week.
- Average consumption of sweets and bakery desserts ranged from about four servings per day (Mexican-American men) to eight servings per day (white men). About two-thirds of white and black men and women and half of Mexican-American men and women consumed 25 or more servings per week.

### Children and Adolescents

#### Based on data from NHANES 2005–06:

- Average whole grain consumption was low, ranging from 0.4 to 0.5 servings a day.
- Fruit consumption was low: 1.3 to 1.5 servings a day among children ages 5 to 9, 1.3 servings a day among children ages 10 to 14, and 0.8 servings a day among adolescents ages 15 to 19. When 100 percent fruit juices were included, servings approximately doubled or tripled.
- Average vegetable consumption was low: 0.8 to 0.9 servings a day, with only 2 percent of children in any age or sex subgroup consuming five or more servings a day.
- Average consumption of nuts, legumes and seeds ranged from 1.0 to 1.2 servings per week among adolescents ages 15 to 19 to 1.4 to 1.7 servings per week at younger ages.
- Average consumption of processed meats ranged from 2.1 to 3.4 servings a week.
- Average consumption of sugar-sweetened beverages was about eight servings per week in children ages 5 to 9, 11 to 14 servings in children ages 10 to 14, and 15 to 23 servings in adolescents ages 15 to 19.
- Average consumption of sweets and bakery desserts was about 10 servings per week in children ages 5 to 9 and 10 to 14, and six to nine servings in adolescents ages 15 to 19.

### Dietary Patterns/Dietary Supplements/Energy Balance

- In 1999–2004, only 19.4 percent of hypertensive U.S. adults were following a DASH-type diet, a decrease from 26.7 percent of hypertensive adults in 1988–94. (*Arch Intern Med*. 2008;168:308-314.)
- NHANES data indicate that between 1971 and 2004, average total energy consumption increased by 22 percent in women (from 1,542 to 1,886 calories per day) and 10 percent in men (from 2,450 to 2,693 calories per day). These increases are largely attributable to greater average carbohydrate intake, particularly of starches, refined grains and sugars. (*JAMA*. 2003;289:450–453.)
- In 2001–04, about half (53 percent) of U.S. adults used dietary supplements, with the most common supplement being multivitamins or multiminerals (67 percent of supplement users). (*Am J Epidemiol*. 2004;160:339-34; *Health, United States, 2008*.)
- Multiple trials of most dietary supplements, including folate, vitamin C, and vitamin E, have generally shown no significant effect on cardiovascular risk. The major exceptions are long-chain omega-3 fatty acids, for which three large randomized, controlled trials have shown significant reductions in risk of cardiovascular disease events when taken at doses of 1 to 2 g/d. (*Lancet*. 1999;354:447–455; *Lancet*. 2007;369:1090–1098; *Lancet*. 2008;372:1223–1230.)



**American Heart Association GWTG-CAD Program.** Get With The Guidelines<sup>SM</sup>—Coronary Artery Disease (CAD) is a national quality improvement initiative of the AHA to help hospitals redesign systems of care to improve adherence to guidelines in patients admitted with a cardiovascular event. Table 18-1 summarizes performance with regard to the selected quality-of-care indicators for CAD events. These were collected from 72,910 patients who were admitted to 317 hospitals participating in the GWTG-CAD program from Jan. 1, 2008, through Dec. 31, 2008.

### Quality of Care by Race/Ethnicity and Sex in the GWTG-CAD Program

Quality of Care Measure (%)	White	Black	Hispanic	Men	Women
Aspirin at admission*	97.6	97.2	97.9	98.0	96.7
Aspirin at discharge*	94.8	92.9	90.8	95.3	92.6
Beta blocker at discharge*	95.1	95.2	92.0	92.0	95.4
ACE inhibitor at discharge	63.2	67.5	64.3	65.3	59.1
ACE inhibitor at discharge for AMI patients	66.2	69.7	70.8	68.4	62.1
ACE inhibitor in LVSD patients	83.5	84.8	81.5	84.5	80.4
ACE inhibitor/ARB for LVSD patients at discharge*	92.7	93.7	90.1	92.2	92.8
Lipid therapy at discharge	84.2	78.0	71.9	85.0	78.7
Lipid therapy at discharge if LDL >100 mg/dL*	92.5	91.7	84.7	93.5	88.3
Patients with last BP < 140/90	81.4	72.3	77.7	82.3	76.5
Smoking cessation counseling*	98.4	98.4	98.3	98.6	98.1
Referral to cardiac rehabilitation for AMI patients	55.8	56.4	64.3	53.8	50.8
Composite quality of care measure**	95.5	95.0	92.6	95.9	94.2

\* Indicates the 5 key achievement 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 achievement 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 for the improvement of quality of care. Participating hospitals are involved in initiatives specifically designed to increase adherence to key quality indicators in patients admitted with an ischemic stroke or transient ischemic attack. The table below summarizes performance on the selected treatment and quality-of-care indicators for acute stroke and secondary prevention. There were 275,728 clinically identified patients who were admitted to 1,155 hospitals participating in the GWTG-Stroke program from Jan. 1, 2008–Dec. 31, 2008.

### Quality of Care by Race/Ethnicity and Sex in the GWTG-Stroke Program

Quality of Care Measure (%)	Overall	White	Black	Hispanic	Men	Women
IV tPA within 3 hr in patients who arrived <2 hr after symptom onset*	62.3	61.8	62.0	62.5	63.9	60.8
IV tPA with 3 hr in patients who arrived <3 hr after symptom onset	49.0	48.9	48.2	48.6	50.7	47.3
Antithrombotics <48 hr after admission*	95.9	96.1	95.5	95.0	96.4	95.6
DVT prophylaxis by second hospital day*	92.2	92.1	92.5	91.2	92.5	92.0
Antithrombotics at discharge*	96.9	97.2	96.0	96.2	97.2	96.7
Anticoagulation for atrial fibrillation at discharge*	93.1	93.2	92.9	91.2	93.5	92.8
Therapy at discharge if LDL >100 mg/dL or LDL not measured or on therapy at admit*	82.1	82.0	82.4	82.1	85.0	79.6
Counseling for smoking cessation*	94.2	94.8	93.3	92.6	94.3	94.1
Stroke education provided	65.5	65.5	67.4	63.4	66.4	64.7
Stroke rehabilitation referral	94.2	94.1	94.9	93.5	93.8	94.6
Composite quality of care measure	91.7	91.7	91.5	90.9	92.6	90.9

In-hospital mortality for the overall patient population was 7.03% and mean length of hospital stay 5.31 days (median 4.00 days).

\*Indicates the 7 key performance measures targeted in GWTG-Stroke.

**American Heart Association GWTG-HF Program.** Get With The Guidelines<sup>SM</sup> (GWTG)—Heart Failure (HF) is an American Heart Association program for the improvement of quality of care. Participating hospitals are involved in initiatives specifically designed to increase adherence to key quality indicators in patients admitted with heart failure. The table below summarizes performance on the selected quality-of-care indicators. These were collected from 66,259 patients who were admitted to 310 hospitals participating in the GWTG-HF program from Jan. 1, 2008–Dec. 31, 2008.

### Quality of Care by Race/Ethnicity and Sex in the GWTG-HF Program

Quality of Care Measure (%)	White	Black	Hispanic	Men	Women
Complete set of discharge instructions*	88.1	90.3	90.2	89.1	85.4
Measure of LV function*	97.0	97.9	94.9	97.3	96.8
ACE or ARB at discharge for patients with LVSD, no contraindications*	90.5	92.9	92.4	91.4	91.2
Smoking cessation counseling, current smokers*	96.7	98.0	97.6	97.2	96.9
Beta blockers at discharge for patients with LVSD, no contraindications*	93.3	92.7	90.1	93.3	92.6
Hydralazine/nitrates at discharge for patients with LVSD, no contraindications	NM	15.7	NM	17.7**	12.9**
Anticoagulation for atrial fibrillation or atrial flutter, no contraindications	60.5	58.8	57.4	61.3	52.3
Composite quality of care measure	93.0	94.2	92.5	93.4	93.1

NM indicates not measured.

\* Indicates the 5 key achievement measures targeted in GWTG-HF.

\*\* For black patients only.

# 13 Medical Procedures

## Total Procedures

- From 1996 to 2006, the total number of inpatient cardiovascular operations and procedures increased 33 percent from 5,444,000 to 7,235,000 annually. (*AHA computation.*)

## Cardiac Catheterization and Percutaneous Coronary Intervention

- From 1996–2006, the number of cardiac catheterizations decreased from 1,161,000 to 1,115,000 annually. (*NHDS, NCHS*)
- In 2006, an estimated 1,313,000 percutaneous coronary intervention (previously referred to as percutaneous transluminal coronary angioplasty) procedures were performed in the United States. (*NHDS, NCHS*)
- In 2006, about 76 percent of stents implanted during percutaneous coronary interventions were drug-eluting as opposed to bare-metal stents (24 percent). (*U.S. Food and Drug Administration, Circulatory System Devices Panel. Meeting minutes, Dec. 8, 2006.*)

## Coronary Artery Bypass Surgery

- The National Center for Health Statistics estimates that in 2006, 448,000 coronary artery bypass procedures were performed on 253,000 patients in the United States.

## Heart Transplantations

- In 2008, 2,163 heart transplantations were performed in the United States. There are 251 transplant hospitals in the United States, 126 of which perform heart transplantations. (<http://www.unos.org/>)
  - In the United States, 72.4 percent of heart transplantation patients are male, 65.5 percent are white, 26.4 percent are younger than age 35, 19.4 percent are ages 35–49, and 54.2 percent are age 50 or older.
  - As of June 5, 2009, the one-year survival rate for males was 88.0 percent and for females it was 86.2 percent; the three-year survival rate was 79.3 percent for males and 77.2 percent for females, and the five-year rate was 73.1 percent for males and 69.0 percent for females.
  - As of June 5, 2009, there were 2,791 heart patients on the transplant waiting list.

### 2007 National Healthcare Cost and Utilization Project Statistics: Mean Hospital Charges and In-Hospital Death Rates for Various Procedures

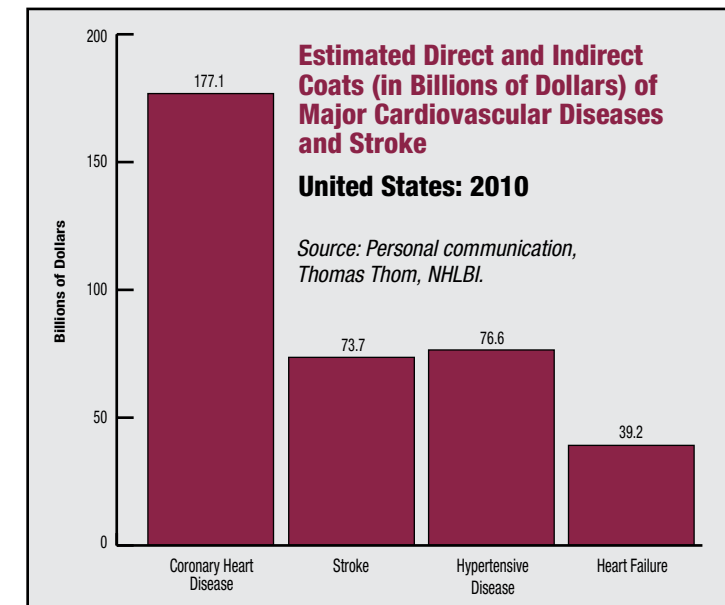
Procedure	Mean Hospital Charges	In-Hospital Death Rate, %
Total Vascular and Cardiac Surgery and Procedures	\$58,559	3.34
CABG	\$112,377	1.95
PCI	\$51,445	0.80
Diagnostic cardiac catheterization	\$31,181	0.79
Pacemaker	\$51,188	1.15
Implantable defibrillator	\$115,763	0.49
Endarterectomy	\$28,584	0.37
Valves	\$157,888	4.77

Source: Agency for Healthcare Research and Quality, *Healthcare Cost and Utilization Project*.

# Economic Cost of Cardiovascular Disease

# 14

- The total direct and indirect cost of cardiovascular diseases and stroke in the United States for 2010 is estimated at \$503.2 billion. This figure includes health expenditures (direct costs, which include the cost of physicians and other professionals, hospital and nursing home services, medications, home health care and other medical durables) and lost productivity resulting from morbidity and mortality (indirect costs). By comparison, in 2008 the estimated cost of all cancer and benign neoplasms was \$228 billion (\$93 billion in direct costs, \$19 billion in morbidity indirect costs and \$116 billion in mortality indirect costs). (*National Heart, Lung, and Blood Institute. Personal communication.*)



### Estimated Direct and Indirect Costs (in Billions of Dollars) of CVD and Stroke: United States: 2010

	Heart Diseases*	Coronary Heart Disease	Stroke	Hypertensive Disease	Heart Failure	Total Cardiovascular Disease†
<b>Direct costs</b>						
Hospital	\$110.2	\$56.6	\$21.0	\$8.5	\$20.9	\$155.7
Nursing home	\$24.7	\$13.0	\$17.1	\$5.1	\$4.7	\$50.8
Physicians/other professionals	\$24.7	\$13.9	\$3.8	\$13.9	\$2.5	\$48.1
Drugs/other						
Medical durables	\$21.5	\$10.0	\$1.3	\$24.7	\$3.2	\$50.7
Home health care	\$8.3	\$2.5	\$5.0	\$2.7	\$3.8	\$18.8
Total expenditures‡	\$189.4	\$96.0	\$48.2	\$54.9	\$35.1	\$324.1
<b>Indirect costs</b>						
Lost productivity/morbidity	\$25.6	\$11.3	\$7.5	\$9.0	...	\$41.7
Lost productivity/mortality‡	\$101.4	\$69.8	\$18.0	\$12.7	\$4.1	\$137.4
<b>Grand total‡</b>	<b>\$316.4</b>	<b>\$177.1</b>	<b>\$73.7</b>	<b>\$76.6</b>	<b>\$39.2</b>	<b>\$503.2</b>

Ellipses (...) indicate data not available.  
 \* This category includes CHD, HF, part of hypertensive disease, cardiac dysrhythmias, rheumatic heart disease, cardiomyopathy, pulmonary heart disease, and other or ill-defined "heart" diseases.  
 † Totals do not add up because of rounding and overlap.  
 ‡ Lost future earnings of persons who will die in 2010, discounted at 3%.  
 All estimates prepared by Thomas Thom, NHLBI.

- Sources:
- Hodgson TA, Cohen AJ. Medical care expenditures for selected circulatory diseases: opportunities for reducing national health expenditures. *Med Care*. 1999;37:994–1012.
  - Centers for Medicare & Medicaid Services, Office of the Actuary. *National Health Expenditure Projections 2008–2018*. Baltimore, Md: Centers for Medicare and Medicaid Services; 2008. Available at: <http://www.cms.hhs.gov/NationalHealthExpendData/downloads/proj2008.pdf>. Accessed June 9, 2009.
  - Rice DP, Hodgson TA, Kopstein AN. The economic costs of illness: a replication and update. *Health Care Financ Rev*. 1985;7:61–80.
  - US Census Bureau, Housing and Household Economic Statistics Division. *Historical income tables: people*. Washington, DC: US Census Bureau; 2008. Available at: <http://www.census.gov/hhes/www/income/histinc/p09ar.html>. Accessed August 30, 2009.
  - Data Warehouse, Mortality Statistics Branch, National Center for Health Statistics. *Worktable 291F: deaths from 113 selected causes, alcohol-induced causes, drug-induced causes, and injury by firearms, by 5-year age groups, race, and sex: United States, 1999–2005*. Hyattsville, Md: Centers for Disease Control and Prevention, US Department of Health and Human Services; 2008. Available at: [http://www.cdc.gov/nchs/data/statab/mortfinal2005\\_worktable\\_291F.pdf](http://www.cdc.gov/nchs/data/statab/mortfinal2005_worktable_291F.pdf). Accessed June 9, 2009.

- **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. Unless otherwise noted, death rates in this publication are age-adjusted per 100,000 population and are based on underlying mortality.
- **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.
- **Any Mention Mortality** — In a given year, the total number of death certificates in which a disease or condition is listed as the underlying cause of death or as a contributing (secondary) cause of death.
- **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 US Department of Health and Human Services (USDHHS). The CDC conducts the:
  - Behavioral Risk Factor Surveillance System (BRFSS), an ongoing study.
  - The NCHS conducts or has 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–...)
    - 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.
- **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 status unknown.

- **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 US 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 3 of the following 5 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, 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, final 2005 mortality statistics, the latest available, didn't become available until late 2007. 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 US 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 1999–2004 applied to 2005 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).
- **Underlying or Contributing Cause of Death** — These terms are used by the NCHS when defining mortality. Underlying mortality is defined by WHO as “the disease or injury which initiated the train of events leading directly to death, or the circumstances of the accident or violence which produced the fatal injury.” Contributing mortality is be any other disease or condition which the decedent may have also had.

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
GCKNKS	Greater Cincinnati/Northern Kentucky Stroke Study	RHD	rheumatic heart disease
GWTG	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		