

# Cardiovascular Disease Prevalence and Mortality

**Q: What are the trends in human disease and conditions for which environmental contaminants may be a risk factors including across population subgroups and geographic regions?**

The above question pertains to all 'Human Disease and Conditions ' Indicators, however, the information on these pages (overview, graphics, references and metadata) relates specifically to "Cardiovascular Disease Prevalence and Mortality". Use the right side drop list to view the other related indicators on this question.

## Introduction

The broad category of cardiovascular disease (CVD) includes any disease involving the heart and blood vessels. Coronary heart disease, cerebrovascular disease (commonly known as stroke), and hypertension are the major cardiovascular diseases (American Heart Association, 2007). In addition to being a major risk factor for heart disease and stroke, hypertension is a commonly diagnosed disease that can also lead to kidney damage and other health problems. Obesity, physical inactivity, and sodium intake are all important risk factors for hypertension (NIH, 2004). Since 1900, CVD has been the leading cause of death in the U.S. every year except 1918 (American Heart Association, 2007) (General Mortality indicator). The U.S. age-adjusted mortality rate for CVD reached a peak in 1950 (CDC, 1999). Between 1950 and 1999, the age-adjusted mortality rate for CVD declined 60 percent. The major risk factors for CVD include tobacco use, high blood pressure, high blood cholesterol, diabetes, physical inactivity, and poor nutrition (CDC, 2004; American Heart Association, 2007).

Environmental exposures may also play a role in CVD morbidity and mortality independent of other risk factors. However, susceptible populations such as the elderly and other high-risk populations may be most impacted. For example, studies have shown exposure to ambient airborne particulate matter to be associated with increased hospitalizations and mortality among older individuals, largely due to cardiopulmonary and cardiovascular disease (U.S. EPA, 2004). Environmental tobacco smoke (ETS) may also contribute to CVD. Although the smoke to which a nonsmoker is exposed is less concentrated than that inhaled by smokers, research has demonstrated increased cardiovascular-related health risks associated with ETS (State of California, 2005).

This indicator presents U.S. adult (age 18 and older) prevalence rates for heart disease (all types), coronary heart disease, stroke, and hypertension; and mortality rates for CVD as a whole as well as coronary heart disease (including myocardial infarction), stroke, and hypertension. CVD prevalence data were compiled between 1997 and 2009 from the National Health Interview Survey (NHIS), conducted by the Centers for Disease Control and Prevention's (CDC's) National Center for Health Statistics (NCHS). The NHIS is the principal source of information on the health of the civilian non-institutionalized population of the U.S. and since 1960 has been one of the major data collection programs of NCHS. CVD prevalence is based on the number of adults who reported that they had ever been told by a doctor or other health practitioner that they had a specified CVD. Mortality data (all ages) were compiled between 1979 and 2007 using the National Vital Statistics System (NVSS), maintained by NCHS. The NVSS registers virtually all deaths and births nationwide, with data coverage from 1933 to 2007 and from all 50 states and the District of Columbia.

## What The Data Show

### *CVD Prevalence*

Among adults 18 years and older, the prevalence of heart disease and stroke between 1997 and 2009 has remained essentially the same (Exhibit 5-23). In contrast, the prevalence of hypertension has shown a general increase from 191 cases per 1,000 in 1997 to 249 cases per 1,000 in 2009.

Gender, race, and age differences in CVD prevalence exist. The prevalence of coronary heart disease is consistently higher among males than among females (81.1 cases per 1,000 for men compared with 49.6 cases per 1,000 for women in 2009). In contrast, hypertension is more prevalent among women (252.3 cases per 1,000 for women compared with 245.2 per 1,000 for men in 2008); however, the gap is narrowing as rates for men have been increasing at a faster pace over time compared to women. Among the racial groups reported, American Indians and Alaska Natives had the highest prevalence of coronary heart disease between 1999 and 2001. Between 2002 and 2009, however, the rates of coronary heart disease in this population exhibited much greater fluctuations ranging from 23.5 per 1,000 (2002) to 69.3 per 1,000 (2003). In 2009, whites had the highest prevalence of coronary heart disease (67.9 cases per 1,000), followed by blacks or African Americans (59.8 cases per 1,000), Asians (32.2 cases per 1,000), and American Indians and Alaska Natives (31.8 cases per 1,000). Between 1999 and 2009, Asians consistently had the lowest prevalence of stroke (9.8 cases per 1,000 in 2009) and hypertension (175.8 cases per 1,000 in 2009) among the racial groups reported. In addition, the Hispanic or Latino population had a consistently lower prevalence of the major CVD-related diseases compared with the non-Hispanic or Latino population from 1999-2009, the period for which these data are available. For example, in 2009, prevalence in Hispanics or Latinos was lower than in non-Hispanics or Latinos for coronary heart disease (37.9 versus 69.1 cases per 1,000, respectively), hypertension (162.5 versus 262.6 cases per 1,000, respectively), and stroke (13.3 versus 28.5 cases per 1,000, respectively). (Data not shown.)

### *CVD Mortality*

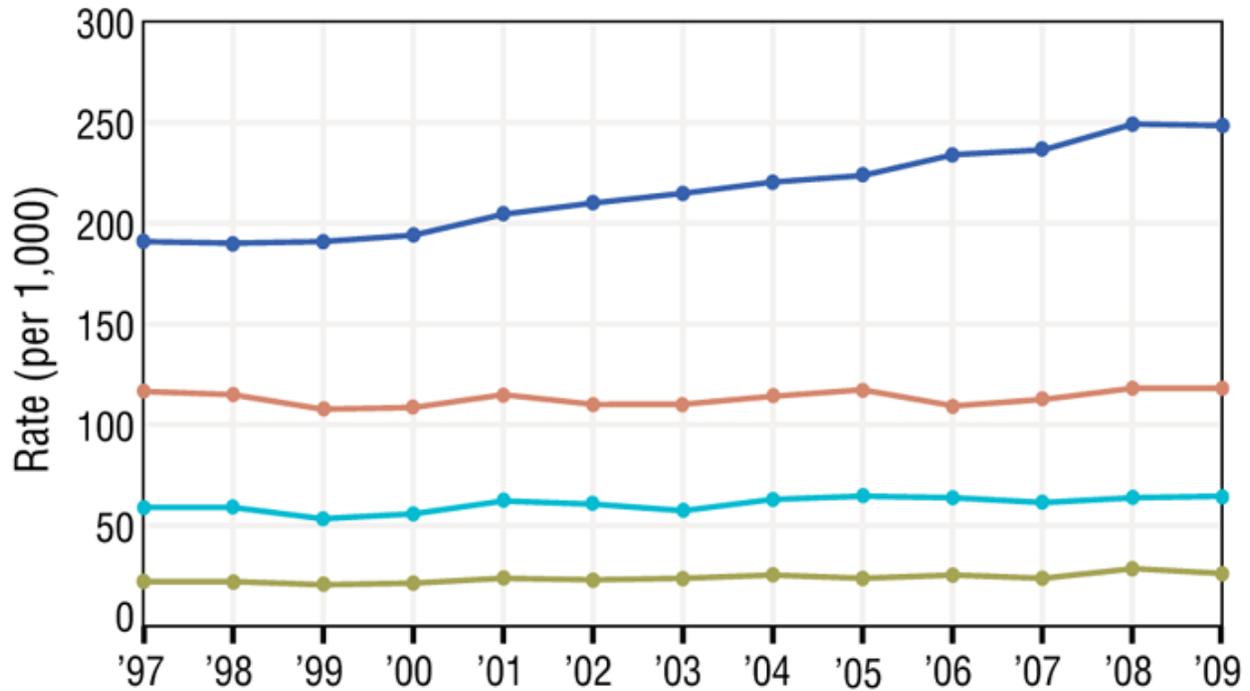
In 1998, the national age-adjusted CVD mortality rate (all types) was 352.0 per 100,000 compared to a rate of 541.0 per 100,000 in 1980 (Exhibit 5-24). This decline continues after 1999, with the rate dropping from 349.3 per 100,000 in 1999 to 249.9 per 100,000 in 2007. Mortality rates for coronary heart disease, stroke, and myocardial infarction—subcategories of CVD—have also declined between 1979 and 1998. The age-adjusted coronary heart disease mortality rate ranged from 345.2 per 100,000 in 1980 to 197.1 per 100,000 in 1998. For stroke mortality, the age-adjusted rate ranged from 97.1 per 100,000 in 1979 to 59.3 per 100,000 in 1998. The age-adjusted mortality rates for myocardial infarction ranged from 157.9 in 1979 to 76.0 per 100,000 in 1998. The decline in mortality from these three CVD subgroups continued to be observed between 1999 and 2007. The age-adjusted mortality rates for coronary heart disease, stroke, and myocardial infarction in 2007 were 126.0, 42.2, and 41.4 per 100,000, respectively, compared to 194.6, 61.6, and 73.2 per 100,000, respectively, in 1999. In contrast, mortality attributed to hypertension has slightly increased between 1999 and 2007 from 15.8 per 100,000 to 17.8 per 100,000.

Both coronary heart disease and stroke mortality have been declining over time in each of the 10 EPA Regions (Exhibits 5-25 and 5-26). In 1979, coronary heart disease and stroke age-adjusted mortality rates ranged from 285.6 (Region 10) to 401.9 (Region 2) per 100,000 and 80.3 (Region 2) to 111.4 (Region 4) per 100,000, respectively. In 1998, coronary heart disease and stroke mortality rates ranged from 145.6 (Region 8) to 233.2 (Region 2) per 100,000 and 43.2 (Region 2) to 68.5 (Region 10) per 100,000, respectively. The decreases in coronary heart disease and stroke mortality also appear to continue in the 1999-2007 period across all EPA regions. In 1999, coronary heart disease and stroke age-adjusted mortality rates ranged from 140.4 (Region 8) to 234.8 (Region 2)

per 100,000 and 43.8 (Region 2) to 72.8 (Region 10) per 100,000, respectively. In 2007, coronary heart disease and stroke mortality rates ranged from 95.2 (Region 8) to 159.2 (Region 2) per 100,000 and 30.3 (Region 2) to 49.8 (Region 6) per 100,000, respectively.

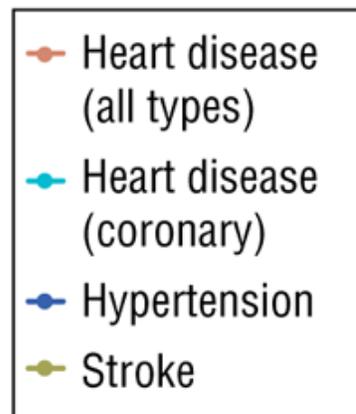
Differences exist in CVD mortality rates among gender, racial, and age groups. For example, in 2007, those age 65 and older had the highest CVD (all types), coronary heart disease, and stroke mortality (1,633, 818.6, and 287.6 per 100,000, respectively). For the same year, the age-adjusted CVD, coronary heart disease, and stroke mortality rates for those 45 to 64 years of age were 161.1, 89.2, and 21.4 per 100,000, respectively. Notable differences in CVD (all types) and, specifically, coronary heart disease mortality rates exist between males and females, but not for stroke mortality. Coronary heart disease mortality among males in 2007 was 165.4 per 100,000, compared to 95.7 per 100,000 for females. In 2007, black or African American males had the highest CVD mortality rate (403.5 per 100,000) compared to white males (292.7 per 100,000), black or African American females (284.2 per 100,000), and white females (204.6 per 100,000). The lowest CVD mortality rates were observed for Asian or Pacific Islander females (125.5 per 100,000) followed by Asian or Pacific Islander males (174.8 per 100,000). (Data not shown.)

**Exhibit 5-23.** Cardiovascular disease prevalence in U.S. adults (age 18 and older), 1997-2009<sup>a</sup>

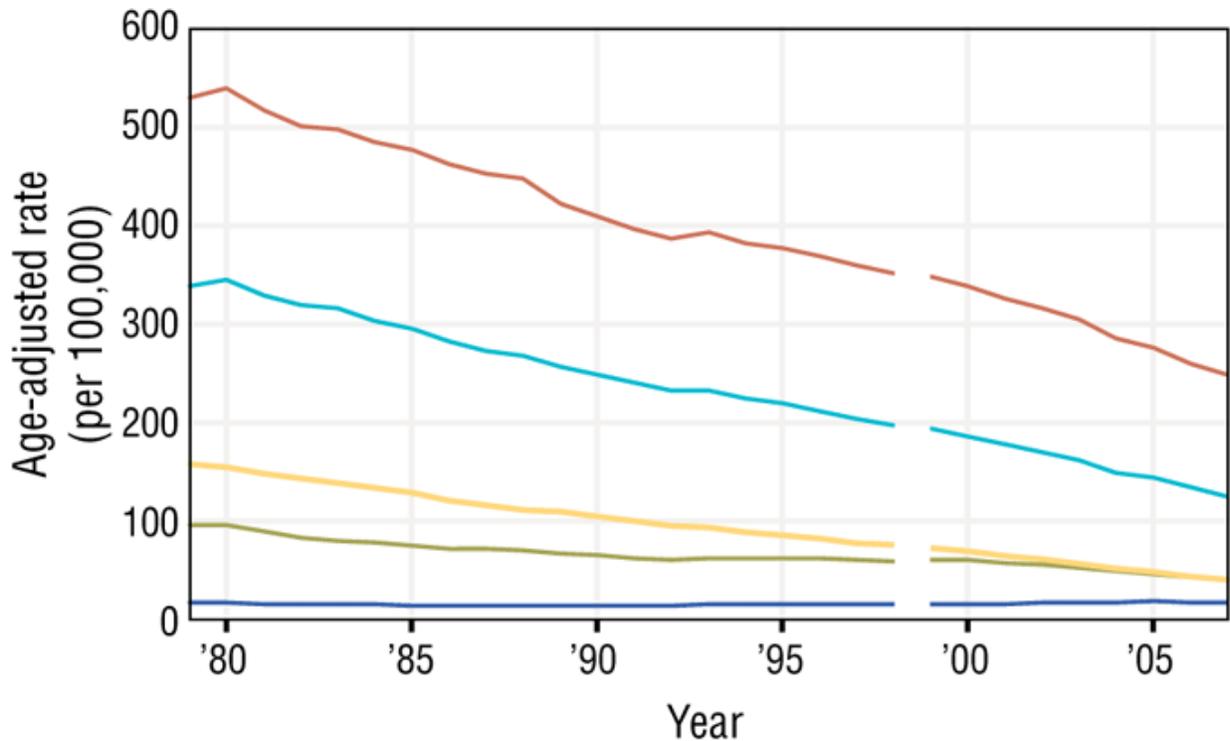


<sup>a</sup>Rates presented are crude rates.

**Data source:** NCHS, 2001-2005, 2006a,b, 2007, 2009a,b, 2010



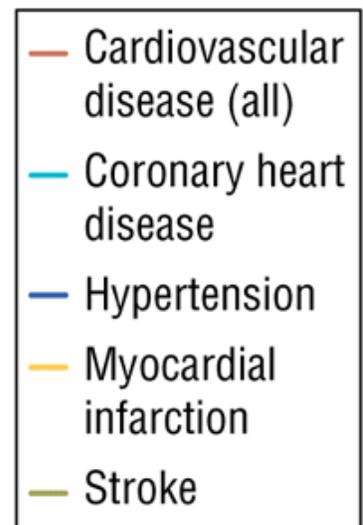
## Exhibit 5-24. Age-adjusted cardiovascular disease mortality rates in the U.S., 1979-2007<sup>a,b</sup>



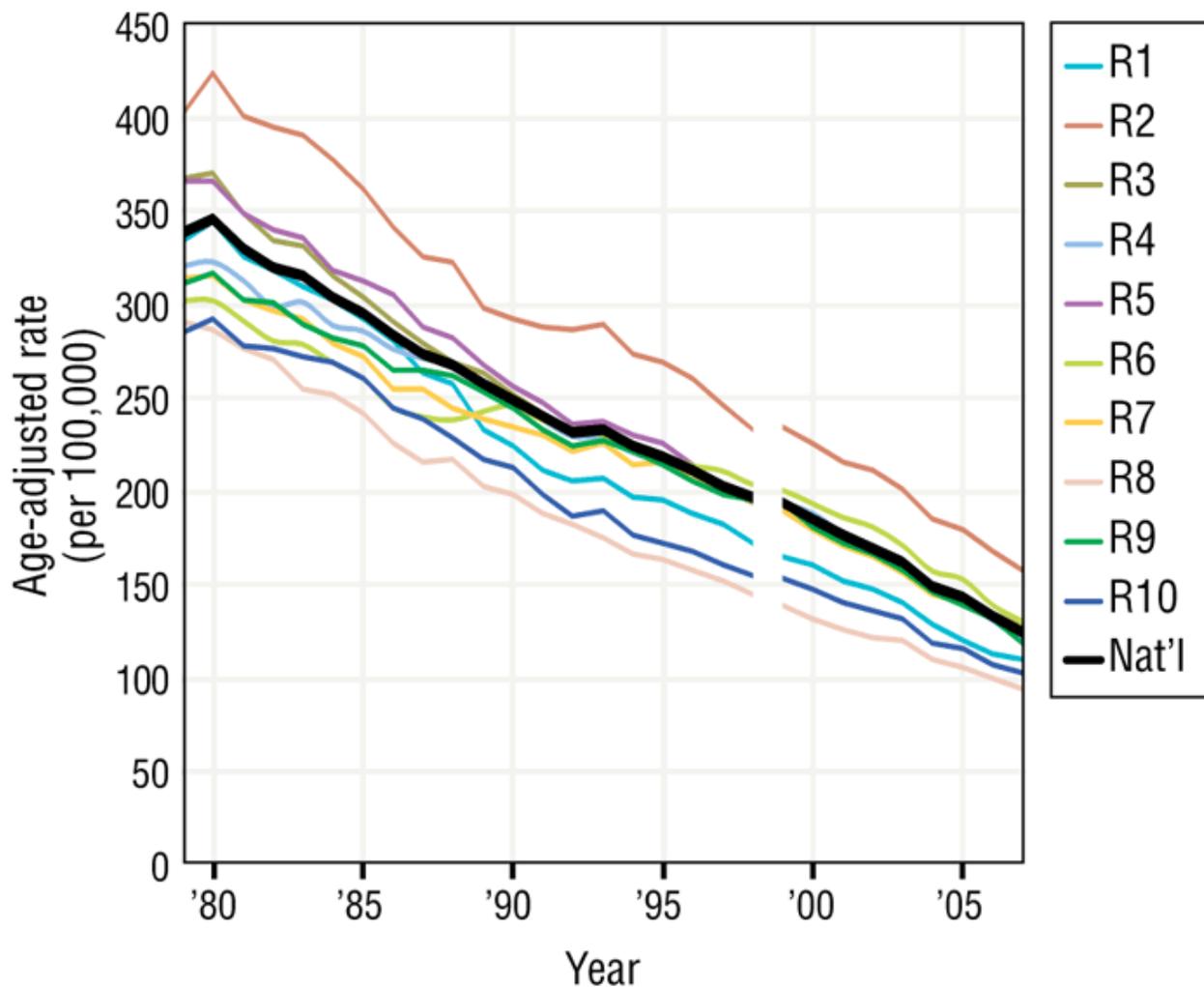
<sup>a</sup>Due to differences in the ICD system used for classifying mortality, data from 1979-1998 should not be directly compared to data from 1999-2007 [ICD-9 codes: 390-434, 436-448 (1979-1998); ICD-10 codes: I00-I78 (1999-2007)].

<sup>b</sup>Rates are age-adjusted to the 2000 U.S. standard population.

**Data source:** CDC, 2011



## Exhibit 5-25. Age-adjusted coronary heart disease mortality rates in the U.S. by EPA Region, 1979-2007<sup>a,b</sup>



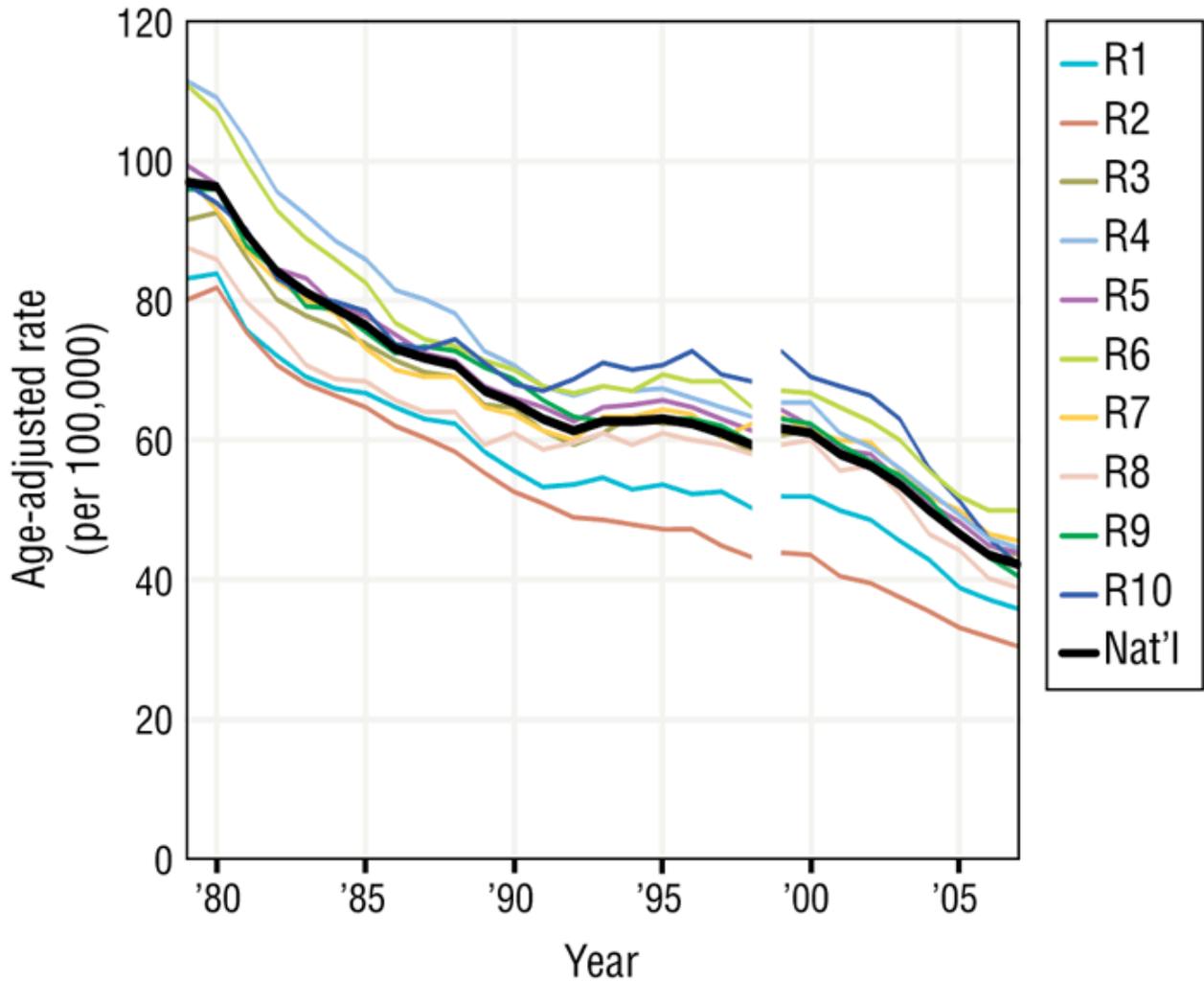
<sup>a</sup>Due to differences in the ICD system used for classifying mortality, data from 1979-1998 should not be directly compared to data from 1999-2007 [ICD-9 codes: 410-414, 429.2 (1979-1998); ICD-10 codes: I20-I25 (1999-2007)].

<sup>b</sup>Rates are age-adjusted to the 2000 U.S. standard population.



*Data source: CDC, 2011*

### Exhibit 5-26. Age-adjusted stroke mortality rates in the U.S. by EPA Region, 1979-2007<sup>a,b</sup>



<sup>a</sup>Due to differences in the ICD system used for classifying mortality, data from 1979-1998 should not be directly compared to data from 1999-2007 [ICD-9 codes: 430-434, 436-438 (1979-1998); ICD-10 codes:



(1979-1998), ICD-9 codes  
I60-I69 (1999-2007)].



<sup>b</sup>Rates are age-adjusted to the  
2000 U.S. standard population.

**Data source: CDC, 2011**

#### Limitations

- Prevalence data reported in the NHIS are based on self-reported responses to specific questions pertaining to CVD-related illnesses, and are subject to the biases associated with self-reported data. Self-reported data can underestimate the disease prevalence being measured if, for whatever reason, the respondent is not fully aware of his/her condition.
- All prevalence data are based on crude rates and are not age-adjusted, as CDC did not report age-adjusted data prior to 2002 in the data sources used for this indicator. Because the possible influence of subgroup age structure has not been removed, the reported disease prevalence rates across time or within different race and gender subgroups may reflect differences in the age distribution of the populations being compared.
- For one or more years for which data are presented, coronary heart disease and stroke prevalence rates presented for Native Americans and Alaska Natives have a relative standard error of greater than 30 percent. In addition, stroke prevalence rates for one or more years for which data are presented for Asians have a relative standard error of greater than 30 percent. As such, these rates should be used with caution as they do not meet the standard of reliability or precision.
- CVD mortality rates are based on underlying cause of death as entered on a death certificate by a physician. Some individuals may have had competing causes of death. “When more than one cause or condition is entered by the physician, the underlying cause is determined by the sequence of conditions on the certificate, provisions of the ICD [International Classification of Diseases], and associated selection rules and modifications” (CDC, n.d.). Consequently, some misclassification of reported mortality might occur in individuals with competing causes of death, as well as the possible underreporting of CVD as the cause of death.
- The International Classification of Diseases 9<sup>th</sup> Revision (ICD-9) codes were used to specify underlying cause of death for years 1979-1998. Beginning in 1999, cause of death is specified with the International Classification of Diseases 10<sup>th</sup> Revision (ICD-10) codes. The two revisions differ substantially, and to prevent confusion about the significance of any specific disease code, data queries are separate.

#### Data Sources

CVD prevalence data were obtained from annual reports published by NCHS (NCHS, 1999-2005, 2006a,b, 2007, 2008, 2009a,b, 2010), which summarize health statistics compiled from the NHIS (<http://www.cdc.gov/nchs/products/pubs/pubd/series/ser.htm>). CVD mortality statistics were

obtained from CDC's "compressed mortality" database, accessed through CDC WONDER (CDC, 2011) (<http://wonder.cdc.gov/mortSQL.html>). EPA Regional mortality statistics were generated by combining and age-adjusting state-by-state totals for each EPA Region using data from CDC WONDER.

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