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Foreword

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Since 1946, CDC has monitored and responded to challenges in the nation's health, with particular focus on reducing gaps between the least and most vulnerable U.S. residents in illness, injury, risk behaviors, use of preventive health services, exposure to environmental hazards, and premature death. We continue that commitment to socioeconomic justice and shared responsibility with the release of *CDC Health Disparities and Inequalities in the United States – 2011*, the first in a periodic series of reports examining disparities in selected social and health indicators.

Health disparities are differences in health outcomes between groups that reflect social inequalities. Since the 1980s, our nation has made substantial progress in improving residents' health and reducing health disparities, but ongoing racial/ethnic, economic, and other social disparities in health are both unacceptable and correctable. Some key findings of this report include:

- Lower income residents report fewer average healthy days. Residents of states with larger inequalities in reported number of healthy days also report fewer healthy days on average. The correlation between poor health and health inequality at the state level holds at all levels of income.
- Air pollution-related disparities associated with fine particulates and ozone are often determined by geographical location. Local sources of air pollution, often in urban counties, can impact the health of people who live or work near these sources. Both the poor and the wealthy in these counties can experience the negative health effects of air pollution; racial/ethnic minority groups, who are more likely to live in urban counties, continue to experience a disparately larger impact.
- Large disparities in infant mortality rates persist. Infants born to black women are 1.5 to 3 times more likely to die than infants born to women of other races/ethnicities.
- Men of all race/ethnicities are two to three times more likely to die in motor vehicle crashes than are women, and death rates are twice as high among American Indians/Alaska Natives.
- Men of all ages and race/ethnicities are approximately four times more likely to die by suicide than females. Though American Indians/Alaska Natives, who have a particularly high rate of suicide in adolescence and early adulthood, account for only about 1% of the total suicides, they share the highest rates with Non-Hispanic whites who in contrast account for nearly 5 of 6 suicides. The suicide rate among AI/ANs and non-Hispanic whites is more than twice that of blacks, Asian Pacific Islanders and Hispanics.
- Rates of drug-induced deaths increased between 2003 and 2007 among men and women of all race/ethnicities, with the exception of Hispanics, and rates are highest among non-Hispanic whites. Prescription drug abuse now kills more persons than illicit drugs, a reversal of the situation 15–20 years ago.
- Men are much more likely to die from coronary heart disease, and black men and women are much more likely to die of heart disease and stroke than their white counterparts. Coronary heart disease and stroke are not only leading causes of death in the United States, but also account for the largest proportion of inequality in life expectancy between whites and blacks, despite the existence of low-cost, highly effective preventive treatment.
- Rates of preventable hospitalizations increase as incomes decrease. Data from the Agency for Healthcare Research and Quality indicate that eliminating these disparities would prevent approximately 1 million hospitalizations and save $6.7 billion in health-care costs each year. There also are large racial/ethnic disparities in preventable hospitalizations, with blacks experiencing a rate more than double that of whites.
- Racial/ethnic minorities, with the exception of Asians/Pacific Islanders, experience disproportionately higher rates of new human immunodeficiency virus diagnoses than whites, as do men who have sex with men (MSM). Disparities continue to widen as rates increase among black and American Indian/Alaska Native males, as well as MSM, even as rates hold steady or are decreasing in other groups.
- Hypertension is by far most prevalent among non-Hispanic blacks (42% vs 28.8% among whites), while levels of control are lowest for Mexican Americans. Although men and women have roughly equivalent hypertension prevalence, women are significantly more likely to have the condition controlled. Uninsured persons are only about half as likely to have hypertension under control than those with insurance, regardless of type.
- Rates of adolescent pregnancy and childbirth have been falling or holding steady for all racial/ethnic minorities in all age groups. However, disparities persist as birth rates for Hispanics and non-Hispanic blacks are 3 and 2.5 times those of whites, respectively.
- More than half of alcohol consumption by adults in the United States is in the form of binge drinking (consuming four or more alcoholic drinks on one or more occasion for women and five or more for men). Younger people and men are more likely to binge drink and consume more alcohol than older people and women. The prevalence of binge drinking is higher in groups with higher incomes and

higher educational levels, although people who binge drink and have lower incomes and less educational attainment levels binge drink more frequently and, when they do binge drink, drink more heavily. American Indian/Native Americans report more binge drinking episodes per month and higher alcohol consumption per episode than other groups.

- Tobacco use is the leading cause of preventable illness and death in the United States. Despite overall declines in cigarette smoking, disparities in smoking rates persist among certain racial/ethnic minority groups, particularly among American Indians/Alaska Natives. Smoking rates decline significantly with increasing income and educational attainment.

Differences in health based on race, ethnicity, or economics can be reduced, but will require public awareness and understanding of which groups are most vulnerable, which disparities are most correctable through available interventions, and whether disparities are being resolved over time. These problems must be addressed with intervention strategies related to both health and social programs, and more broadly, access to economic, educational, employment, and housing opportunities. The combined effects of programs universally available to everyone and programs targeted to communities with special needs are essential to reduce disparities. I hope CDC's partners will use this periodic report to better understand and address disparities and help all persons in the United States live longer, healthier, and more productive lives.

Rationale for Regular Reporting on Health Disparities and Inequalities — United States

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Background

Most U.S. residents want a society in which all persons live long, healthy lives (*1*); however, that vision is yet to be realized fully. As two of its primary goals, CDC aims to reduce preventable morbidity and mortality and to eliminate disparities in health between segments of the U.S. population. The first of its kind, this 2011 CDC Health Disparities and Inequalities Report (2011 CHDIR) represents a milestone in CDC's long history of working to eliminate disparities (*2–6*).

Health disparities are differences in health outcomes and their determinants between segments of the population, as defined by social, demographic, environmental, and geographic attributes (*7*). *Health inequalities,* which is sometimes used interchangeably with the term health disparities*,* is more often used in the scientific and economic literature to refer to summary measures of population health associated with individual- or group-specific attributes (e.g., income, education, or race/ethnicity) (*8*). *Health inequities* are a subset of health inequalities that are modifiable, associated with social disadvantage, and considered ethically unfair (*9*). Health disparities, inequalities, and inequities are important indicators of community health and provide information for decision making and intervention implementation to reduce preventable morbidity and mortality. Except in the next section of this report that describes selected health inequalities, this report uses the term health disparities as it is defined in U.S. federal laws (*10,11*) and commonly used in the U.S. public health literature to refer to gaps in health between segments of the population.

Public Health Importance of Health Disparities

Increasingly, the research, policy, and public health practice literature report substantial disparities in life expectancy, morbidity, risk factors, and quality of life, as well as persistence of these disparities among segments of the population (*12–16*). In 2007, the *Healthy People 2010 Midcourse Review* revealed progress on certain objectives but less than adequate progress toward eliminating health disparities for the majority of objectives among segments of the U.S. population, defined by race/ethnicity, sex, education, income, geographic location, and disability status (*17*).

During 1980–2000, the U.S. population became older and more ethnically diverse (*18*), and during 1992–2005, household income inequality increased (*19*). Although the combined effects of changes in the age structure, racial/ethnic diversity, and income inequality on health disparities are difficult to assess, the nation is likely to continue experiencing substantial racial/ethnic and socioeconomic health disparities, even though overall health outcomes measured by *Healthy People 2010* objectives are improving for the nation. Because vulnerable populations are more likely than others to be affected adversely by economic recession, the recent downturn in the global economy might worsen health disparities throughout the United States if the coverage and effectiveness of safety-net and targeted programs do not keep pace with needs (*20*).

About This Report

CHDIR 2011 consolidates the most recent national data available on disparities in mortality, morbidity, behavioral risk factors, health-care access, preventive health services, and social determinants of critical health problems in the United States by using selected indicators. Data presented throughout CHDIR 2011 provide a compelling argument for action. The data pertaining to inequalities in income, morbidity, mortality, and self-reported healthy days highlight the considerable and persistent gaps between the healthiest persons and states and the least healthy. However, awareness of the problem is insufficient for making changes. In the analytic essays that follow, certain specific actions, in the form of universally applied and targeted interventions, are recommended. A common theme among the different indicators presented in CHDIR 2011 is that universally applied interventions will seldom be sufficient to address the problems effectively. However, success stories among the indicators (i.e., the virtual elimination of disparities in certain vaccination rates among children) can be used to identify strategies for addressing remaining disparities.

CDC's role in addressing disparities will continue to include surveillance, analysis, and reporting through periodic CHDIRs. In addition, CDC has a key role in encouraging use of evidence-based strategies, supporting public health partners, and convening expert and public stakeholders to secure their commitment to take action.

The primary target audiences for CHDIR 2011 include practitioners in public health, academia and clinical medicine, the media, general public, policymakers, program managers, and researchers. CHDIR 2011 complements but does not duplicate the contents of the annual National Healthcare Disparities Report (*12*) and the periodic reports related to *Healthy People 2010* (*17*).

CHDIR 2011 contains a limited collection of topics, each exploring selected indicators of critical U.S. health problems. Topics included in CHDIR 2011 were selected on the basis of one or more of the following criteria: 1) leading causes of premature death among segments of the U.S. population as defined by sex, racial/ethnicity, income or education, geography, and disability status; 2) social, demographic, and other disparities in health outcomes; 3) health outcomes for which effective and feasible interventions exist; and 4) availability of high-quality national-level data. For each of the topics and indicators, subject-matter experts used the most recent national data available to describe disparity measures (absolute or relative) by sex, race/ethnicity, family income (percentage of federal poverty level), educational attainment, disability status, and sexual orientation. Because of limits on data availability and optimal size of the report, certain topics of potential interest in the health disparities literature have been excluded. For example, disparities by country of birth and primary language spoken are not included in this report. Residential segregation, a social determinant of health, will be included in a future report when census tract level data from the 2010 U.S. Census become available in 2011. In each topic-specific analytic essay, the contributors describe disparities in social and health determinants among population groups. Each narrative and its tabular and graphic elements reveal the findings, their meaning, and implications for action if known.

The National Partnership for Action (NPA) to end health disparities is a national plan for eliminating health disparities affecting U.S. racial/ethnic minorities sponsored by the U.S. Department of Health and Human Services (DHHS) Office of Minority Health. One of NPA's five objectives is to ensure the availability of health data for all racial/ethnic minority populations. CHDIR 2011 will contribute to the achievement of that objective.

Measures of Health Inequality

Disparities are most often presented as a series of pair-wise comparisons: strata of a particular variable compared with a referent group. An index of disparity summarizes pair-wise comparisons into a single measure of disparity among a population (*21*). Health inequality — measured by using methods that originated in economics — provides summary measures that capture inequality in the overall distribution of health among persons or groups within a population.

A measure of health inequality can summarize in one number, instead of multiple pair-wise comparisons, the difference between individual persons or segments of a population with regard to a health outcome or related attribute by using all information available about the whole population instead of only the extremes of the distribution (*22*). Consistent estimates of health inequality at national, state, tribal, or local levels enable useful comparisons across indicators of health status and across time for each indicator; reveal targets for reducing inequality at multiple levels of geography; and compare inequality in the need for services with availability of services for different population segments. Thus, health indicators with lower inequality among the overall U.S. population but with higher inequality within certain groups require further exploration by focusing specifically on the determinants and potential remedies for the higher inequalities within population groups. If the data were available, the indicators in this report could be compared and ranked in terms of the degree of inequality among the U.S. population overall and within specific segments. To illustrate what might be possible with adequate data in future reports, three indicators of inequality are presented and compared by using the Gini index of inequality (*23*): 1) inequalities in income; 2) years of potential life lost (YPLL) before age 75 years; and 3) the Health and Activities Limitation Index (HALex), a measure of health-related quality-of-life (HRQL).

The Gini index, the most commonly used measure of income inequality, measures the extent to which the income distribution among a population deviates from theoretical income distribution in which each proportion of the population earns the same proportion of total income. The index varies from 0 to 1, with higher values indicating greater inequality (i.e., 0 indicates complete equality, and 1 indicates perfect inequality). The Gini index has been adapted to measure health inequality across populations by providing estimates that capture the distribution of health, or health risk, among the entire population or within specific groups. Researchers and policymakers recognize the importance of both individual- and group-level approaches in measuring health inequality because they capture different dimensions of health inequality that can complement one another to strengthen the overall assessment of population health (*13,24,25*).

Individual-Level Measures of Inequality

Income inequality. Income inequality in the United States (Gini index of 0.46 in 2007) (Table, Figure 1) is the highest among advanced industrialized economies (e.g., the combined Gini index for countries in the European Union and Russia is 0.31, ranging from the lowest score of 0.23 in Sweden to the highest for Russia at 0.41) (*26,27*), and demonstrates an increasing trend during 1997–2007 (Table, Figure 1). During this period, the U.S. median household income fluctuated but experienced an overall increasing trend. A Gini index of 0.46 in 2007 is half of the average relative

TABLE. Inequality in income, premature mortality, and health-related quality of life — United States, 1997–2007

	Year										
Inequality measure	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
Median household income[*]	$49,497	$51,295	$52,587	$52,500	$51,356	$50,756	$50,711	$50,535	$51,093	$51,473	$52,163
Household income inequality (Gini index)[*]	0.4590	0.4560	0.4580	0.4620	0.4660	0.4620	0.4640	0.4660	0.4690	0.4700	0.4630
Between-state income inequality (Gini index)[†]	0.0628	0.0636	0.0612	0.0646	0.0658	0.0671	0.0624	0.0701	0.0677	0.0713	0.0749
Premature mortality (years of potential life lost before age 75 yrs/100,000 population)[§]	7108.3	6960.6	6920.0	6899.5	6940.6	6965.2	6970.7	6841.5	6912.9	6882.0	6799.5
Between-state inequality in premature mortality (Gini index) [§]	0.0762	0.0785	0.0820	0.0850	0.0819	0.0861	0.0868	0.0926	0.0939	0.0963	0.0956
Mean Health and Activities Limitation Index (HALex),[¶] ages 18–65 yrs	0.8766	0.8762	0.8779	0.8783	0.8747	0.8722	0.8711	0.8712	0.8708	0.8684	0.8662
Inequality in HALex[¶] (Gini index), ages 18–65 yrs	0.0928	0.0872	0.0848	0.0840	0.0871	0.0884	0.0888	0.0878	0.0886	0.0904	0.0862

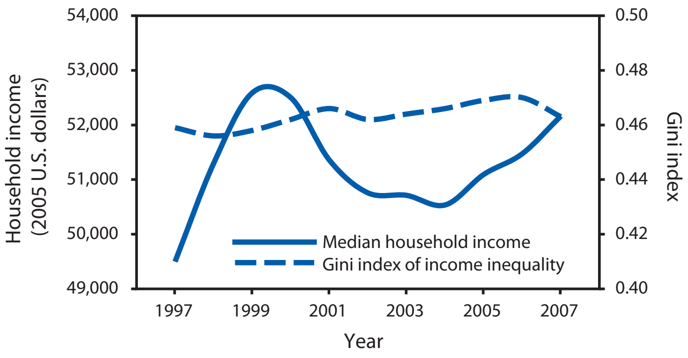
[*] DeNavas-Walt, Carmen, Bernadette D. Proctor, and Jessica C. Smith, U.S. Census Bureau, Current Population Reports, P60-235, Income, Poverty, and Health Insurance Coverage in the United States: 2007, U.S. Government Printing Office, Washington, DC, 2008.

[†] Based on the U.S. Census Bureau, Current Population Survey, 1997–2007, annual social and economic supplements.

[§] Years of potential life lost estimates were extracted from CDC's Web-based Injury Statistics Query and Reporting System (WISQARS). Available at http://www.cdc.gov/injury/wisqars/index.html. Data source: CDC/National Center for Injury Prevention and Control (NCIPC). WISQARS years of potential life lost (YPLL) reports, 1999–2007. Atlanta, GA: US Department of Health and Human Services, CDC, NCIPC. Available at http://webappa.cdc.gov/sasweb/ncipc/ypll10.html. Population estimates were extracted from CDC Wonder. Available at http://wonder.cdc.gov/.

[¶] Mean of and Inequality in Health and Activities Limitation Index were estimated by using data retrieved from the National Health Interview Surveys, 1997–2007.

FIGURE 1. Median household income[*] and income inequality[†] — United States, 1997–2007



Source: DeNavas-Walt, Carmen, Bernadette D. Proctor, and Jessica C. Smith, U.S. Census Bureau, Current Population Reports, P60-235, Income, Poverty, and Health Insurance Coverage in the United States: 2007, U.S. Government Printing Office, Washington, DC, 2008.

[*] 2005 U.S. dollars.

[†] Based on Gini index.

difference (0.92) in average income between any two U.S. households chosen at random. The relative difference in average income is the absolute difference in average income ($64,590) between any two households divided by the average income for all households ($70,207) (*28*).

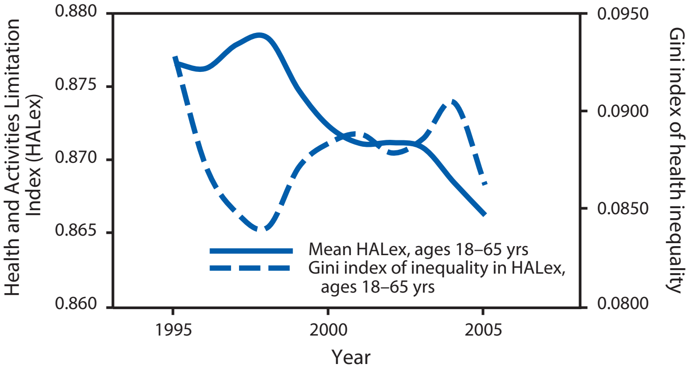
HALex. HALex provides one individual-level measure of HRQL that can be used to monitor health status as well as examine inequalities in morbidity across time and groups. HALex provides a numerical measure that combines information on self-rated health and activity limitation reported in nationally representative surveys (*29,30*). HALex scores can theoretically range from 1.00 for persons who have no activity limitation and are in excellent health to 0.10 for persons who are limited in activities of daily living (ADL) and are in poor health. HALex scores are based on assumptions and are described elsewhere (*29,30*). For example, a person in excellent health with activities of daily living disabilities is considered as healthy, with an assigned HALex score of 0.47, as a person in poor health with no disabilities.

The average HALex and inequality for HALex among U.S. adults for 1997–2007 is estimated and presented (Figure 2). Although U.S. residents are living longer, the average HRQL among adults (ages 18–65 years), measured by using HALex, demonstrated a declining trend from 0.8766 in 1997 to 0.8662 in 2007. During the same period, health inequality among individual persons, as measured by the Gini index for HALex, fluctuated, varying from 0.084 to 0.093, and experienced an overall declining trend from 0.093 in 1997 to 0.087 in 2007.

Group-Level Measures of Inequality

Income inequality. The Gini index measuring inequality between states in average household income increased slightly from 0.063 in 1997 to 0.075 in 2007 (Table, Figure 2). Inequality between states is lower than inequality between individual persons across the nation as a whole because the former is based on average values within states; averaging attenuates some of the variability between individual persons. Nonetheless, this trend indicates that income inequality between states is increasing with time.

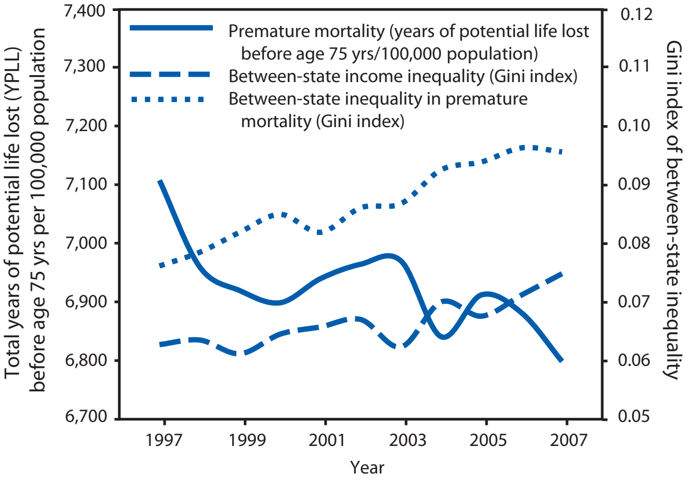
FIGURE 2. Average Health and Activities Limitation (HALex) and inequality in HALex among adults aged 18–65 years* — United States, 1997–2007



Source: Gini index and mean of Health and Activities Limitation Index were estimated by using data retrieved from the National Health Interview Surveys, 1997–2007. Available at http://www.cdc.gov/nchs/nhis.htm.

* Based on Gini index.

FIGURE 3. Premature mortality rate* and inequality in income and premature mortality rate between states† — United States, 1997–2007



Source: Gini Index and mean of years of potential life lost (YPLL) were authors' calculation based on YPLL data extracted from CDC's Web-based Injury Statistics Query and Reporting System (WISQARS) (Available at http://www.cdc.gov/injury/wisqars/index.html.) and population estimates extracted from CDC WONDER (Available at http://wonder.cdc.gov). Between-state inequalities in household income were authors' calculation based on data from the U.S. Census Bureau, Current Population Survey, 1997–2007, annual social and economic supplements.

* Years of potential life lost (YPLL) before age 75 years per 100,000 population.

† Based on Gini index.

Premature mortality. YPLL before age 75 years is a common measure of premature mortality. Although the rate of premature mortality in the United States has been declining in recent years, considerable variation in rates still exists across states, with the inequality in YPLL between states, as measured by the Gini index, increasing from 0.076 in 1997 to 0.096 in 2007 (Table, Figure 3). A Gini index of inequality of YPLL of 0.096 in 2007 is related directly to the average difference in YPLL/100,000 population between any two states chosen at random (average difference = 0.19 YPLL/100,000 population).

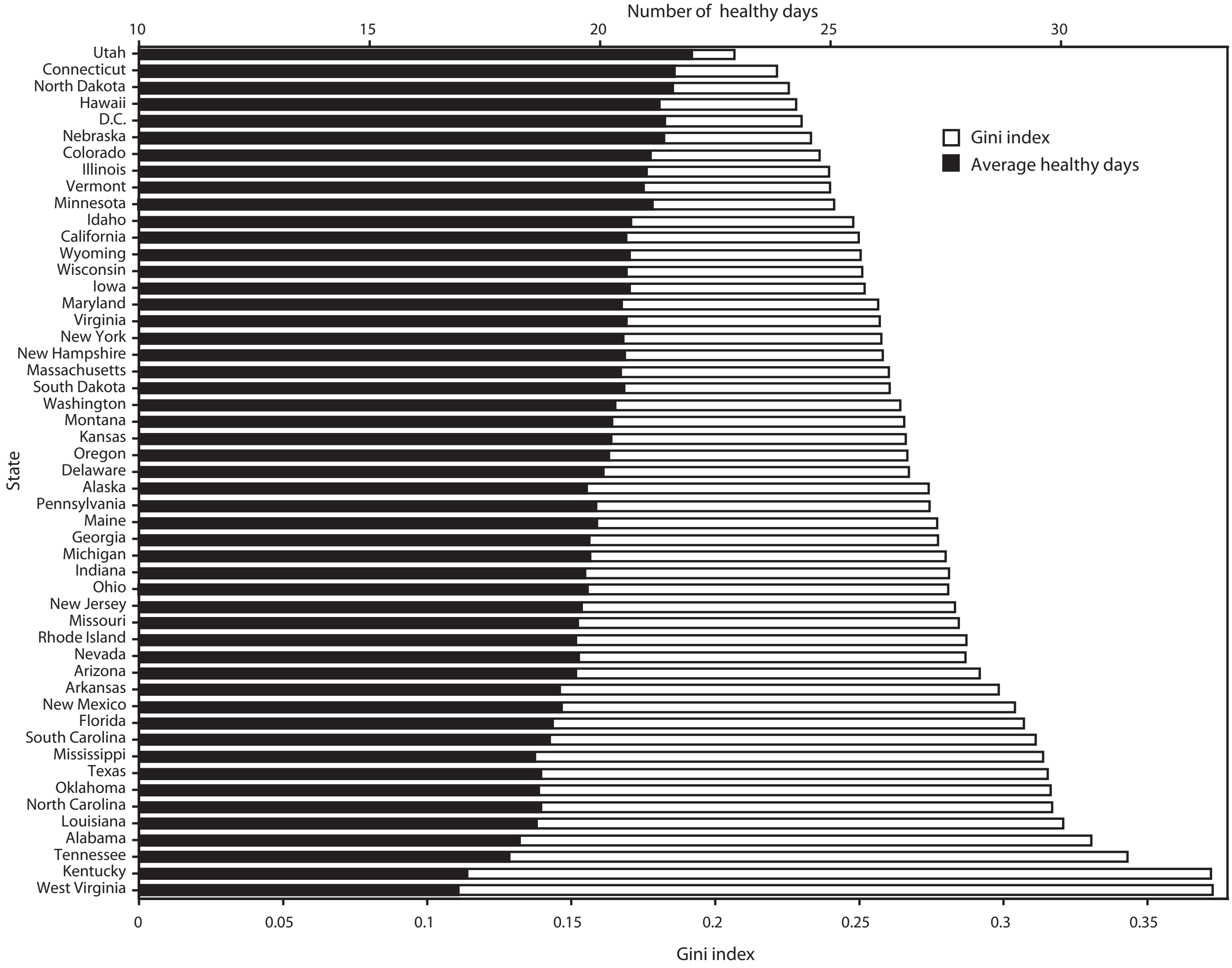
Healthy days. The number of healthy days is an HRQL measure routinely reported by CDC and considered particularly useful in identifying health disparities among population groups (*31*). Healthy days are measured as the overall number of days during the previous 30 days during which a person reported good (or better) physical and mental health. The average number of healthy days and the inequality in healthy days among adults (ages ≥18 years) by states is estimated by using data from the 2007 Behavioral Risk Factor Surveillance System. Certain states (e.g., Utah, Connecticut, and North Dakota) that have the highest mean healthy days have the lowest health inequality, and vice versa (Figure 4).

This examination of inequalities indicates that inequalities in income, YPLL, HALex, and healthy days measured across individual persons and among states were present in 2007. The magnitude of inequality or trends in inequality during 1997–2007 varies on the basis of measures used and depending on whether individual- or group-level data are analyzed. The healthy days analysis indicates that states that have lower average health also have higher health inequality. At each level (low, medium, high) of the U.S. income distribution, higher health inequality is associated with lower average number of healthy days ($p<0.001$, t-test of slope coefficient of linear regression line) (Figure 5). Using YPLL, HALex, and healthy days to illustrate the potential value of health inequality measures in this report does not resolve controversies surrounding the choice of appropriate measures of premature mortality and HRQL for monitoring population health status in the United States (*17,32*). Research into the attributes and psychometric properties of alternative measures of premature mortality and HRQL is ongoing. Emerging consensus on the best available measures for monitoring health disparities and inequalities in premature mortality and HRQL should be reflected in future editions of this report.

Gaps in the National Data

Efforts to monitor and report periodically on health disparities are confronted by data gaps in two critical disparity domains defined in the *Healthy People* series of national planning objectives (*1,13*): 1) disability status and 2) sexual orientation and identity. In CHDIR 2011, data gaps in disability status are evident. Only eight of the 22 topics include health disparities by disability status. Federal interagency working groups are discussing strategies for expanding the collection of data by disability status. Data gaps in sexual orientation are even more severe in that only one topic (human immunodeficiency virus diagnosis) contains information on disparities in a health outcome by a sexual behavior (i.e., men who have sex with men) that is related but not identical to sexual orientation, identity, or attraction. Similar discussions are under way regarding strategies to expand the collection of data by dimensions of sexual orientation (identity or attraction) and disability status.

FIGURE 4. State-specific Gini index of inequality in number of healthy days and average number of healthy days — United States, 2007.



Source: Gini index and mean of number of healthy days was estimated by using data retrieved from the Behavioral Risk Factor Surveillance System, 2007. Available at http://www.cdc.gov/BRFSS.

Gaps in Disability Data

Regularly published health reports that include information on health disparities typically do not include disability status as a dimension for comparison. For example, of the 27 chapters in *Healthy People 2010*, a total of 10 included no objectives for disability,* and of 108 related objectives from other focus areas in the Disability and Secondary Conditions focus area, 71 had no source for disability data (*17*). However, recent publications have indicated the need for standard reporting of comparative health status between persons with and without disabilities (*33,34*). Disability includes impairments or limitations in activities or social participation as a result of an interaction between a person's environment and his or her health condition (*35*) that might be permanent and variable in severity. In surveys, disability is measured or determined to exist in multiple ways, depending on the purpose of the data and the mechanism used for data collection. In nationwide data systems, the level of detail that can be obtained (i.e., type of disability, severity, underlying cause, or duration) is defined operationally within the context of the particular survey employed. For example, in the National Health Interview Survey, which is administered in a face-to-face interview that permits extensive questioning, 32 questions are used to provide a detailed description of a person's disability (*36*). In the Behavioral Risk Factor Surveillance System, which places a

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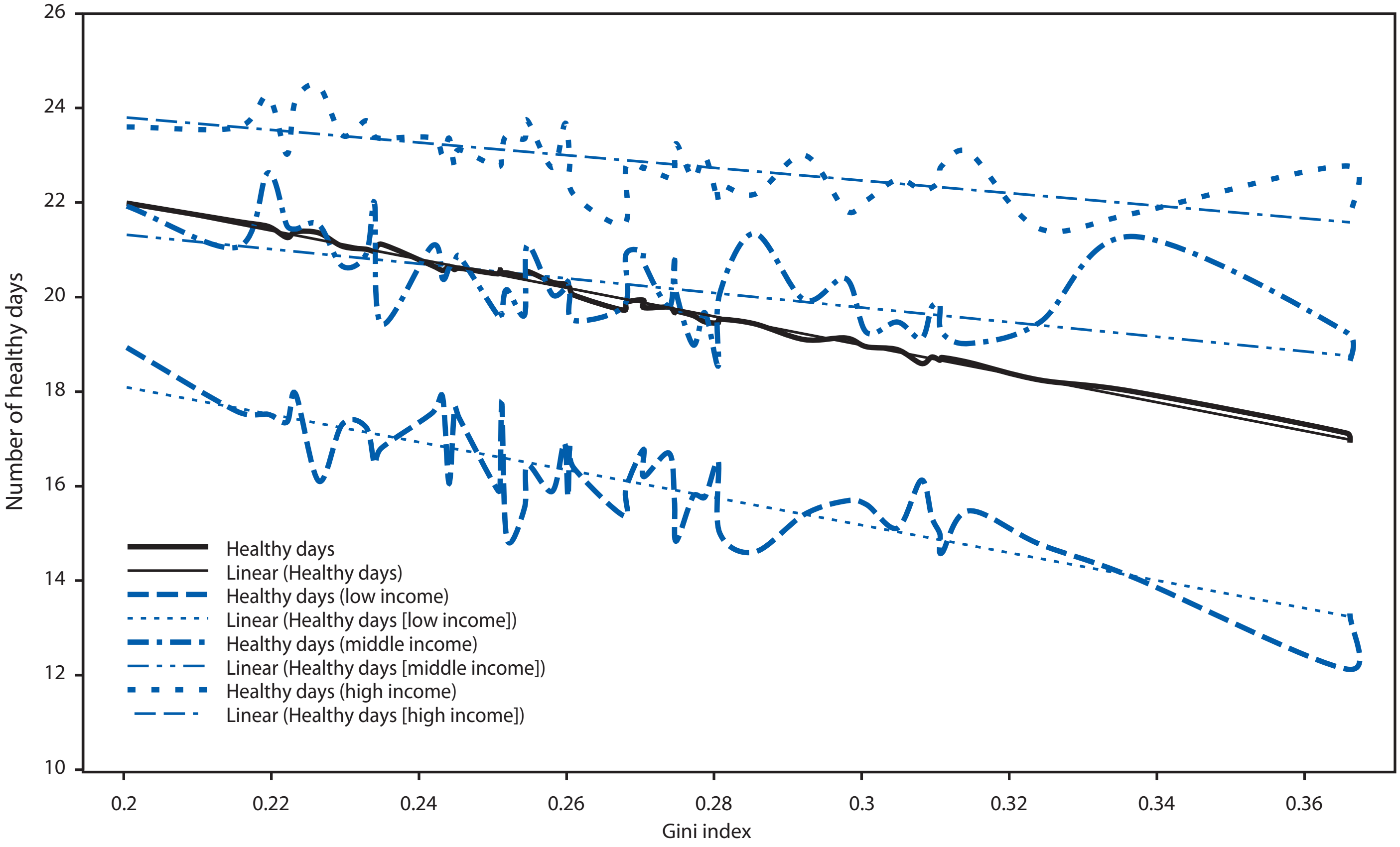
*Arthritis, osteoporosis, and chronic back conditions; chronic kidney disease; environmental health; human immunodeficiency virus infection; injury and violence prevention; mental health and mental disorders; public health infrastructure; respiratory diseases; sexually transmitted diseases; and substance abuse.

FIGURE 5. Gini index and average number of healthy days, by income group — United States, 2007.



Source: Gini index and average number of healthy days was estimated by using data retrieved from the Behavioral Risk Factor Surveillance System, 2007. Available at http://www.cdc.gov/BRFSS/.

premium on brevity, a binary indicator of disability is determined as a positive response to either of two questions having to do with a limitation in any activity related to physical, mental, or emotional problems, or use of assistive equipment (e.g., a cane, wheelchair, special bed, or special telephone). Both *Healthy People 2010* and *Healthy People 2020* have an objective to include a standard set of disability questions in the core of all relevant data systems to address this lack of consistency. Future CHDIR reports will contain more data on disability and be of better quality and greater salience to the reduction of health disparities adversely affecting persons with disabilities.

Gaps in Data Regarding Sexual Orientation

Data collection and analysis gaps in health disparities by sexual orientation are even more severe. Although *Healthy People 2010* specifies that health disparities include "differences that occur by gender, race or ethnicity, education or income, disability, geographic location, or sexual orientation," only a limited number of regularly published national- or state-level health reports include information on sexual orientation (lesbian, gay, bisexual, transsexual, or heterosexual identity) as a demographic variable for comparison. Research studies have identified health disparities among sexual minority populations and explored concepts of sexual identity and one's perception of one's emotional, romantic, and sexual attraction (*37*). Standard reporting of sexual identity/orientation or sexual behavior on national health surveys is necessary if these health inequities are to be observed and attenuated among population groups. Data on sexual orientation or sexual behavior from the National Survey of Family Growth (NSFG) have been published (*38*,*39*). More recent NSFG data will be released soon and improve on the ascertainment of sexual identity. At the state level, Massachusetts has collected sexual orientation data through its Youth Risk Behavior Survey and Washington has done so recently on its Behavioral Risk Factor Surveillance System survey (*40*). Information on sexual behavior, a concept that describes behavior instead of identity or attraction, also can be used to investigate health and health-care characteristics across population groups. However, it is not collected in most national- and state-level surveys. In addition to consistent and routine collection of sexual orientation or behavior as demographic variables, analysis and publication of findings is critical. Researchers have published NHANES data on human immunodeficiency virus infection prevalence among men who have sex with men (*41*). However, NHANES data do not support reliable analyses of disparities by sexual orientation. As reflected in this report, data are lacking for assessing health disparities by sexual identity/orientation. Future CHDIRs might be able to include additional national-level data comparing health outcomes by sexual identity, sexual orientation, or sexual behavior. To fill this notable data gap, national and state surveys should begin consistently and routinely measuring sexual identity, orientation, and behavior. Data collection should be expanded to include not only age, sex, education, income, and race/ethnicity, but also disability, geographic location, and sexual identity or sexual orientation. Only then can health disparities be measured thoroughly and accurately nationwide.

Conclusion

The existence and persistence of substantial disparities in mortality, morbidity, risk behaviors, and hazardous environmental exposures between and among segments of the U.S. population have been well-documented. In 2007, the *Healthy People 2010 Midcourse Review* revealed progress on certain objectives but less than adequate progress toward eliminating health disparities for the majority of objectives among segments of the U.S. population defined by race/ethnicity, sex, education, income, geographic location, and disability status, and did not address disparities by sexual orientation (*17*). Whether disparities are measured as pair-wise comparisons between groups, as an index of disparity, or as summary measures of inequality, the results are the same.

This report focuses on disparities in selected specific health determinants and outcomes by sex, race/ethnicity, education, income, disability status, and geography. However, in several problem areas described in the topic-specific analytic essays, subject-matter experts have identified promising programs and interventions that might be effective in reducing disparities. By focusing public and policymaking attention on fewer, more critical disparities that are potentially modifiable by universal and targeted interventions, this periodic report should motivate increased efforts to intervene at the state, local, tribal, and community levels where stakeholders are more familiar with the problems and control resources for their abatement. Universal interventions are available to everyone while targeted interventions are implemented among populations with special needs (*42*).

Insufficient evidence exists regarding effectiveness of particular interventions in reducing specific disparities among certain defined populations. To fill this gap in evidence of programmatic effectiveness, the Task Force on Community Preventive Services recently has embarked on a series of systematic reviews of interventions that might help reduce disparities (Robert Hahn, CDC, personal communication, 2010). However, until more evidence of effectiveness is available, certain actions are prudent in support of efforts to reduce health disparities and their antecedents in the United States. Such actions include 1) increasing community awareness of disparities as problems with solutions; 2) setting priorities among disparities to be addressed at the federal, state, tribal, and local levels; 3) articulating valid reasons to expend resources to reduce and ultimately eliminate priority disparities; 4) implementing dual strategy of universal and targeted intervention programs on the basis of lessons learned from success in reducing selected disparities (e.g., racial/ethnic disparities in measles vaccination coverage); and 5) aiming to achieve a faster rate of improvement among disadvantaged groups by allocating resources in proportion to need and a commitment to closing modifiable gaps in health, longevity, and quality of life among all segments of the U.S. population.

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Social Determinants of Health

Education and Income — United States, 2005 and 2009

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The socioeconomic circumstances of persons and the places where they live and work strongly influence their health (*1,2*). In the United States, as elsewhere, the risk for mortality, morbidity, unhealthy behaviors, reduced access to health care, and poor quality of care increases with decreasing socioeconomic circumstances (*2,3*). This association is continuous and graded across a population and cumulative over the life course (*2,3*). Educational attainment and family or household income are two indicators used commonly to assess the influence of socioeconomic circumstances on health (*4*). Education is a strong determinant of future employment and income. In the majority of persons, educational attainment reflects material and other resources of family of origin and the knowledge and skills attained by young adulthood. Therefore, it captures both the long-term influence of early life circumstances and the influence of adult circumstances on adult health. Income is the indicator that most directly measures material resources. Income can influence health by its direct effect on living standards (e.g., access to better quality food and housing, leisure-time activities, and health-care services).

To assess disparities in the prevalence of noncompletion of high school and poverty, CDC analyzed data from the 2005 and 2009 Integrated Public Use Microdata Series — Current Population Survey (IPUMS-CPS) (*5*). CPS is a cross-sectional monthly household survey of a representative sample of the civilian, noninstitutionalized U.S. household population and is conducted jointly by the U.S. Census Bureau and the Bureau of Labor Statistics. Adults are asked demographic and employment-related questions, including age, sex, race/ethnicity, level of education attained, total family income, family composition, and disability status. Poverty status, measured by the poverty-to-income ratio (PIR), was derived from the established federal poverty level (FPL), which is revised annually to reflect changes in the cost of living as measured by the Consumer Price Index (*6*). Group disparities in age-standardized prevalence of noncompletion of high school and poverty (PIR <100% of FPL) were assessed according to sex, race/ethnicity, age, education, PIR, and disability. Referent groups were selected that demonstrated the most favorable group estimates; for racial/ethnic disparities, white males and females were selected as referent groups because they were the largest groups (*7,8*). Absolute disparity was measured as the simple difference between a group estimate and the estimate for its respective referent group. Relative disparity (percentage difference) was obtained by expressing the value for the absolute difference as a percentage of the value for the referent group. For example, with females as the referent group, the relative disparity in prevalence between males and females is the absolute disparity divided by the value for females, with the fraction expressed as a percentage. To evaluate change in disparity during 2005–2009, CDC used these same methods to calculate absolute and relative differences for the groups in 2005 and subtracted statistically significant relative differences in 2005 from their counterparts in 2009 (*7,8*). Statistically significant increases and decreases in relative difference from 2005 to 2009 were interpreted as increases and decreases in disparity with time, respectively. SAS-callable (SAS Institute Inc., Cary, North Carolina) SUDAAN (Research Triangle Institute, Research Triangle Park, North Carolina) software that accounted for the CPS complex sample design was used, with sample weights, replicate weights, and the balanced repeated replication (with Fay's correction = 4) design option used to produce point estimates, standard errors, and 95% confidence intervals (*5*). Absolute disparities and the differences between significant relative disparities were assessed by using the z statistic and a two-tailed test; a p-value of <0.05 was used to assess statistical significance. A relative disparity was considered statistically significant if its numerator was a significant absolute disparity. Estimates were age-adjusted to the year 2000 age distribution of the U.S. population (*9*). Comparative terms (e.g., higher and similar) indicate the results of statistical testing at the 0.05 level.

Among the 2009 population, statistically significant disparities were identified in noncompletion of high school for all the characteristics studied (Table 1). The absolute difference between the age-standardized percentages of males and females who had not completed high school (1.85 percentage points; $p<0.05$) indicated a limited sex disparity. Except for non-Hispanic Asian/Pacific Islander males, the absolute differences between the age-standardized percentages of each nonwhite racial/ethnic group and non-Hispanic whites who had not completed high school were statistically significant. The racial/ethnic relative disparity from non-Hispanic whites was greatest for Hispanics and non-Hispanic American Indians/Alaska Natives, lowest for the non-Hispanics of mixed race and Asians/Pacific Islanders, and intermediate for non-Hispanic blacks. The degree of racial/ethnic relative disparity varied markedly among the nonwhite racial/ethnic groups, ranging from three to nine times greater for Hispanics than for other groups. Absolute differences between the age-standardized prevalence of noncompletion of high school in each PIR group and the referent group (<100% below FPL) were statistically significant overall and among both males and females. Income disparity in prevalence of noncompletion of high school increased with decreasing PIR, such that the disparity was >200% for the group living below FPL. Significant absolute differences in age-standardized prevalence of noncompletion of high school were identified between the youngest age group, age groups

TABLE 1. Age-standardized[*] percentage of adults aged ≥18 years who did not complete high school and disparities, by sex, race/ethnicity, poverty-income-ratio, disability, and age group — Integrated Public Use Microdata Series, Current Population Survey, United States, 2005 and 2009

	2005			2009		
Characteristic	Age-standardized percentage (SE)	Absolute difference[†]	Relative difference[§] (%)	Age-standardized percentage (SE)	Absolute difference	Relative difference (%)
Sex						
Male	16.6 (0.2)	1.6[¶]	10.7	15.1 (0.2)	1.9[¶]	13.9
Female	15.0 (0.2)	—	—	13.3 (0.2)	—[**]	—
Race/Ethnicity						
Both sexes						
White, non-Hispanic	10.5 (0.2)	—	—	9.0 (0.1)	—	—
Black, non-Hispanic	21.3 (0.5)	10.8[¶]	103.1	18.1 (0.4)	9.1[¶]	100.9
Asian/Pacific Islander	14.0 (0.6)	3.5[¶]	33.2	12.5 (0.6)	3.5[¶]	38.4
American Indian/Alaska Native	27.3 (1.9)	16.8[¶]	160.5	20.5 (1.6)	11.5[¶]	127.3
Mixed race, non-Hispanic	14.2 (0.9)	3.8[¶]	35.8	14.7 (1.0)	5.7[¶]	63.3
Hispanic	43.1 (0.5)	32.7[¶]	311.5	38.8 (0.5)	29.8[¶]	330.4
Male						
White, non-Hispanic	11.3 (0.2)	—	—	9.8 (0.2)	—	—
Black, non-Hispanic	22.4 (0.7)	11.2[¶]	99.4	19.1 (0.6)	9.4[¶]	95.8
Asian/Pacific Islander	11.8 (0.7)	1.0	4.9	10.7 (0.7)	0.9	9.2
American Indian/Alaska Native	28.2 (2.7)	16.9[¶]	150.2	21.9 (2.1)	12.2[¶]	124.6
Mixed race, non-Hispanic	13.5 (1.3)	2.3	20.2	15.0 (1.4)	5.3[¶]	53.8
Hispanic	43.9 (0.7)	32.7[¶]	290.3	40.2 (0.7)	30.4[¶]	311.9
Female						
White, non-Hispanic	9.7 (0.2)	—	—	8.3 (0.1)	—	—
Black, non-Hispanic	20.4 (0.6)	10.7[¶]	110.0	17.4 (0.5)	9.1[¶]	110.0
Asian/Pacific Islander	15.8 (0.8)	6.0[¶]	62.2	13.9 (0.7)	5.6[¶]	67.6
American Indian/Alaska Native	26.2 (2.2)	16.5[¶]	169.8	19.7 (1.8)	11.4[¶]	137.8
Mixed race, non-Hispanic	14.8 (1.3)	5.1[¶]	52.4	14.1 (1.1)	5.8[¶]	70.10
Hispanic	42.1 (0.6)	32.3[¶]	333.1	37.1 (0.6)	28.8[¶]	348.2
Poverty-income ratio[††]						
Both sexes						
<1.00	35.1 (0.5)	23.7[¶]	206.5	33.1 (0.6)	23.0[¶]	227.7
1.00–1.24	34.0 (0.8)	22.5[¶]	196.4	29.1 (0.7)	19.0[¶]	188.1
1.25–1.49	30.9 (0.9)	19.4[¶]	169.0	25.4 (0.7)	15.3[¶]	151.1
≥1.50	11.5 (0.1)	—	—	10.1 (0.1)	—	—
Male						
<1.00	35.7 (0.9)	22.9[¶]	178.8	35.0 (0.9)	23.7[¶]	208.6
1.00–1.24	36.6 (1,1)	23.8[¶]	186.0	33.2 (1.1)	21.8[¶]	192.2
1.25–1.49	35.1 (1.3)	22.3[¶]	174.2	28.9 (1.0)	17.6[¶]	154.8
≥1.50	12.8 (0.2)	—	—	11.4 (0.2)	—	—
Female						
<1.00	34.8 (0.6)	24.8[¶]	247.4	31.7 (0.6)	23.0[¶]	261.8
1.00–1.24	31.9 (0.9)	21.9[¶]	218.0	26.2 (0.8)	17.4[¶]	198.3
1.25–1.49	27.6 (1.0)	17.6[¶]	175.3	22.4 (0.9)	13.7[¶]	155.9
≥1.50	10.0 (0.2)	—	—	8.8 (0.1)	—	—
Disability status						
Both sexes						
Disability	28.0 (0.6)	13.6[¶]	94.2	23.6 (0.4)	11.3[¶]	91.9
No disability	14.4 (0.2)	—	—	12.3 (0.1)	—	—
Male						
Disability	29.3 (0.8)	14.0[¶]	92.1	23.7 (0.6)	10.2[¶]	75.9
No disability	15.2 (0.2)	—	—	13.5 (0.2)	—	—
Female						
Disability	26.6 (0.7)	13.0[¶]	95.7	23.5 (0.6)	12.3[¶]	109.5
No disability	13.6 (0.2)	—	—	11.2 (0.2)	—	—

See footnotes on next page.

TABLE 1. *Continued*. Age-standardized* percentage of adults aged ≥18 years who did not complete high school and disparities, by sex, race/ethnicity, poverty-income-ratio, disability, and age group — Integrated Public Use Microdata Series, Current Population Survey, United States, 2005 and 2009

	2005			2009		
Characteristic	**Age-standardized percentage (SE)**	**Absolute difference[†]**	**Relative difference[§] (%)**	**Age-standardized percentage (SE)**	**Absolute difference**	**Relative difference (%)**
Age group (yrs)[§§]						
18–44	14.8 (0.2)	2.76[¶]	22.9	13.7 (0.2)	2.7[¶]	24.3
45–64	12.0 (0.2)	—	—	11.0 (0.2)	—	—
65–79	23.9 (0.4)	11.85[¶]	98.5	19.5 (0.4)	8.5[¶]	77.3
≥80	32.1 (0.9)	20.10[¶]	167.1	27.6 (0.8)	16.6[¶]	150.7
Male						
18–44	16.3 (0.3)	3.88[¶]	31.3	15.3 (0.3)	3.6[¶]	30.7
45–64	12.4 (0.3)	—	—	11.7 (0.3)	—	—
65–79	23.6 (0.6)	11.20[¶]	90.3	18.5 (0.6)	6.89[¶]	58.0
≥80	30.1 (1.3)	17.70[¶]	142.7	27.2 (1.1)	15.5[¶]	132.1
Female						
18–44	13.3 (0.2)	1.61[¶]	13.8	12.1 (0.2)	1.7[¶]	16.6
45–64	11.7 (0.2)	—	—	10.4 (0.2)	—	—
65–79	24.1 (0.6)	12.42[¶]	106.2	20.4 (0.5)	10.0[¶]	96.7
≥80	33.3 (1.0)	21.65[¶]	185.2	27.9 (0.9)	17.5[¶]	169.0

Abbreviation: SE = standard error.

[*] Standard population = U.S. Census 2000.

[†] Defined as the simple difference between a group estimate and the estimate for its respective referent group.

[§] Obtained by expressing the value for the absolute difference as a percentage of the estimate for its respective referent group.

[¶] Difference between group estimate and referent category estimate statistically significant (2-tailed test; p<0.05).

[**] Referent.

[††] On the basis of the U.S. federal poverty level (FLP). FLP was based on U.S. Census Bureau poverty thresholds, available at http://www.census.gov/hhes/www/poverty.html.

[§§] Age-specific estimates are not age-standardized.

≥65 years, and the referent group (age 45–65 years). Significant disability relative disparity in noncompletion of high school was also present overall and among both sexes, with a greater degree of disparity among females than males because of the lower value of the referent point for females. No statistically significant differences were observed between the relative disparities in noncompletion of high school for 2005 and 2009.

During 2009, the group disparities in poverty observed were similar to those for noncompletion of high school (Table 2). Marked absolute and relative racial/ethnic disparity in poverty was greatest for non-Hispanic blacks, American Indians/Alaska Natives, and Hispanics of both sexes. The age-standardized prevalence of poverty was 15–20 percentage points higher among persons who had not completed high school than it was among those with more education than high school; an approximate twofold relative disparity existed among both sexes. No statistically significant differences were identified between relative disparities in poverty observed for 2005 and 2009.

The findings presented in this report are subject to at least two limitations. First, all data were self-reported and therefore subject to recall and social desirability bias. Second, because cross-sectional data were used for the analyses, no causal inferences can be drawn from the findings.

Striking disparities in noncompletion of high school and poverty exist within the U.S. adult population; no improvement was realized between 2005 and 2009. The patterning of the disparities is consistent with sociodemographic differences reported by multiple national surveys (*2,10–12*). These findings indicate that a substantial proportion of the adult population is vulnerable to health problems because of insufficient resources. The data provided in this report can be used as a baseline for subsequent monitoring of progress toward the elimination of health disparities.

TABLE 2. Age-standardized* percentage of adults aged ≥18 years who lived below the federal poverty level and disparities, by sex, race/ethnicity, education, disability, and age group — Integrated Public Use Microdata Series, Current Population Survey, United States, 2005 and 2009

	2005			2009		
Characteristic	Age-standardized percentage (SE)	Absolute difference[†]	Relative difference[§] (%)	Age-standardized percentage (SE)	Absolute difference	Relative difference (%)
Sex						
Men	9.3 (0.2)	—	—	9.7 (0.2)	—[¶]	—
Women	12.9 (0.2)	3.6**	39.2	13.4 (0.2)	3.7**	38.3
Race/Ethnicity						
Both sexes						
White, non-Hispanic	8.3 (0.2)	—	—	8.4 (0.2)	—	—
Black, non-Hispanic	20.9 (0.5)	12.6**	151.2	20.6 (0.5)	12.2**	145.5
Asian/Pacific Islander	10.0 (0.3)	1.7**	20.2	11.4 (0.6)	3.0**	35.4
American Indian/Alaska Native	22.9 (1.7)	14.5**	174.8	20.4 (2.3)	12.0**	143.0
Mixed race, non-Hispanic	12.7 (0.8)	4.3**	52.2	14.5 (1.1)	6.1**	72.8
Hispanic	17.8 (0.5)	9.5**	114.2	19.0 (0.5)	10.6**	126.8
Men						
White, non-Hispanic	7.0 (0.2)	—	0	7.0 (0.2)	—	—
Black, non-Hispanic	17.0 (0.7)	10.0**	141.3	17.1 (0.6)	10.1**	145.0
Asian/Pacific Islander	9.4 (0.7)	2.3**	33.1	10.6 (0.7)	3.6**	52.0
American Indian/Alaska Native	18.7 (2.0)	11.6**	165.3	17.8 (2.5)	10.9**	156.2
Mixed race, non-Hispanic	10.5 (1.1)	3.5**	49.7	12.2 (1.3)	5.2**	73.0
Hispanic	14.8 (0.5)	7.8**	110.2	16.1 (0.6)	9.2**	131.9
Women						
White, non-Hispanic	9.5 (0.2)	—	0	9.7 (0.2)	—	—
Black, non-Hispanic	23.9 (0.6)	14.4**	152.3	23.4 (0.6)	13.7**	141.1
Asian/Pacific Islander	10.6 (0.7)	1.1	11.9	12.1 (0.7)	2.4**	24.5
American Indian/Alaska Native	26.8 (2.2)	17.3**	182.4	22.8 (2.6)	13.1**	135.2
Mixed race, non-Hispanic	14.6 (1.2)	5.1**	53.7	16.7 (1.4)	7.0**	72.1
Hispanic	21.0 (0.6)	11.5**	121.6	22.0 (0.6)	12.3**	126.4
Education						
Both sexes						
<High school	25.2 (0.5)	18.7**	285.0	27.4 (0.5)	20.5	298.3
High school	12.2 (0.2)	5.6**	85.8	13.2 (0.2)	6.3	92.1
>High school	6.6 (0.1)	—	—	6.9 (0.1)	—	—
Men						
<High school	20.1 (0.5)	14.7**	270.3	22.7 (0.6)	17.1**	307.7
High school	10.0 (0.3)	4.6**	85.2	10.6 (0.3)	5.0**	90.1
>High school	5.4 (0.2)	—	—	5.6 (0.2)	—	—
Women						
<High school	31.0 (0.6)	23.4**	310.6	32.7 (0.6)	24.7**	308.2
High school	14.4 (0.3)	6.9**	90.8	16.2 (0.3)	8.2**	102.1
>High school	7.5 (0.2)	—	—	8.0 (0.2)	—	—
Disability status						
Both sexes						
Disability	27.3 (0.6)	17.7**	183.6	25.0 (0.5)	15.4**	159.4
No disability	9.6 (0.1)	—	—	9.6 (0.1)	—	—
Men						
Disability	24.4 (0.9)	16.4**	207.1	21.0 (0.7)	13.0**	166.8
No disability	7.9 (0.2)	—	—	8.0 (0.2)	—	—
Women						
Disability	30.1 (0.8)	18.9	167.9	28.9 (0.7)	17.7**	159.0
No disability	11.2 (0.2)	—	—	11.2 (0.2)	—	—

See footnotes on next page.

TABLE 2. *Continued*. Age-standardized* percentage of adults aged ≥18 years who lived below the federal poverty level and disparities, by sex, race/ethnicity, education, disability, and age group — Integrated Public Use Microdata Series, Current Population Survey, United States, 2005 and 2009

Characteristic	2005			2009		
	Age-standardized percentage (SE)	Absolute difference[†]	Relative difference[§] (%)	Age-standardized percentage (SE)	Absolute difference	Relative difference (%)
Age group (yrs)[††]						
Both sexes						
18–44	12.9 (0.2)	4.2**	47.5	13.5 (0.2)	4.5**	49.6
45–64	8.8 (0.2)	—	—	9.2 (0.2)	—	—
65–79	9.3 (0.3)	0.5	5.9	9.0 (0.3)	0.1	1.4
≥80	11.3 (0.5)	2.6**	29.3	11.5 (0.5)	2.5**	27.4
Men						
18–44	10.6 (0.2)	3.7**	52.9	11.1 (0.2)	4.6**	70.6
45–64	8.1 (0.3)	1.2**	16.7	8.7 (0.2)	2.2	33.9
65–79	7.0 (0.3)	—	—	6.5 (0.4)	—	—
≥80	7.0 (0.7)	0.1	1.0	7.4 (0.8)	0.9	13.4
Women						
18–44	15.2 (0.3)	5.9**	62.6	15.9 (0.3)	6.3**	66.3
45–64	9.3 (0.2)	—	—	9.6 (0.2)	—	—
65–79	11.2 (0.5)	1.8**	19.6	11.1 (0.4)	1.5**	16.1
≥80	13.9 (0.6)	4.5**	48.6	13.9 (0.7)	4.4**	45.6

Abbreviation: SE = standard error.

* Standard population = U.S. Census 2000.

[†] Defined as the simple difference between a group estimate and the estimate for its respective referent group.

[§] Obtained by expressing the value for the absolute difference as a percentage of the estimate for its respective referent group.

[¶] Referent.

** Difference between group estimate and referent category estimate statistically significant (2-tailed test; p<0.05).

[††] Age-specific estimates are not age-standardized.

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Environmental Hazards

Inadequate and Unhealthy Housing, 2007 and 2009

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Healthy homes are essential to a healthy community and population (*1,2*). They contribute to meeting physical needs (e.g., air, water, food, and shelter) and to the occupants' psychological and social health. Housing is typically the greatest single expenditure for a family. Safe housing protects family members from exposure to environmental hazards, such as chemicals and allergens, and helps prevent unintentional injuries. Healthy housing can support occupants throughout their life stages, promote health and safety, and support mental and emotional health. In contrast, inadequate housing contributes to infectious and chronic diseases and injuries and can affect child development adversely (*1*).

To assess the percentage of persons in the United States living in inadequate or unhealthy homes, CDC analyzed data from the American Housing Survey (AHS) for 2007 and 2009 (*3*). The U.S. Census Bureau conducts AHS to assess the quality of housing in the United States and to provide up-to-date statistics to the U.S. Department of Housing and Urban Development (HUD). AHS is a national representative survey that collects data on an average of 55,000 U.S. housing units, including apartments, single-family homes, mobile homes, and vacant housing units. The same housing units are visited every 2 years during odd-numbered years, with census bureau interviewers conducting home visits or telephone interviews during April through mid-September of each survey year (*4*). Information for unoccupied units is obtained from landlords, rental agents, or neighbors.

The definition of inadequate housing is related to the basic structure and systems of a housing unit, whereas the definition of unhealthy housing is related to exposure to toxins and other environmental factors. Inadequate housing is defined as an occupied housing unit that has moderate or severe physical problems (e.g., deficiencies in plumbing, heating, electricity, hallways, and upkeep) (*5,6*). Examples of moderate physical problems in a unit include two or more breakdowns of the toilets that lasted >6 months, unvented primary heating equipment, or lack of a complete kitchen facility in the unit. Severe physical problems include lack of running hot or cold water, lack of a working toilet, and exposed wiring. (The specific algorithm used to categorize a unit as inadequate has been published elsewhere [*6*]). For the purposes of this report, CDC has defined unhealthy housing as the presence of any additional characteristics that might negatively affect the health of its occupants, including evidence of rodents, water leaks, peeling paint in homes built before 1978, and absence of a working smoke detector. Other indicators of unhealthy housing, such as poor air quality from mold or radon, are not measured by AHS and therefore are not included in the analysis.

In AHS, housing unit is a house, an apartment, a flat, a manufactured (mobile) home, or one or more rooms occupied or intended for occupancy as separate living quarters. Separate living quarters have direct access to the unit from the outside or from a public hall. A household consists of all persons who occupy a housing unit. The householder is the first member contacted by the interviewer who is aged ≥18 years and is an owner or a renter of the housing unit. Household members might be a family or a nonfamily group of friends or unmarried partners. In AHS, each respondent belongs to a household, might be a householder, lives in a housing unit, or might be part of a family.

This report includes estimates of the percentage of occupied housing units that are classified as inadequate or unhealthy by selected demographic characteristics of the householder. Estimates of the relative disparity in the percentage of householders who live in inadequate housing by sex, race/ethnicity, annual income, highest level of completed education, geographic region, and disability status are reported as unadjusted odds ratios with 95% confidence intervals (CIs). Because the replicate weights are not made public, unadjusted odds ratios are the best estimates available, and CIs were calculated by using the probability weights included in the data set. This calculation method is the best available, but its use cannot determine sampling error associated with the sample design, and the method might overestimate the variance, making the CI narrower. To determine statistical significance between years or within a category, the CIs for the particular variables were compared. If the odds ratio (OR) did not fall within the confidence interval for the next year or other variable, the difference was considered statistically significant.

The proportion of housing units classified as inadequate in the United States in 2009 was 5.2%, a percentage that is unchanged from 2007 (Table 1). Female householders were 1.1 times more likely to occupy inadequate housing units than male householders. In 2009, by race/ethnicity, non-Hispanic blacks had the highest odds of householders living in inadequate housing (2.3), followed by Hispanics (2.0), American Indians/Alaskan Natives (1.9), and Asians/Pacific Islanders (1.1) when compared with non-Hispanic whites.

In the 2009 survey, Hispanic female householders (7.4%) were significantly less likely than Hispanic male householders (8.1%) to live in inadequate housing (Table 1). Non-Hispanic black female householders were significantly more likely than non-Hispanic white female householders to live in unhealthy housing during both 2007 and 2009 (OR = 1.3 and 1.4, respectively) (Table 2). Although the

TABLE 1. Selected characteristics of householders* in inadequate housing† — American Housing Survey, United States, 2007 and 2009

	2007					2009				
	Total occupied housing units	Inadequate housing units				Total occupied housing units	Inadequate housing units			
Characteristic		No.	(%)	Unadjusted OR	(95% CI)		No.	(%)	Unadjusted OR	(95% CI)
Sex										
Male	61,206	2,862	(4.7)	Ref.	—	60,721	2,962	(4.9)	Ref.	—
Female	49,486	2,909	(5.9)	1.1	(1.1–1.2)	51,084	2,795	(5.5)	1.1	(1.1–1.2)
Race/Ethnicity§										
White, non-Hispanic	78,744	3,174	(4.0)	Ref.	—	79,333	3,222	(4.1)	Ref.	
Hispanic	12,609	966	(7.7)	2.0	(1.7–2.3)	12,739	991	(7.8)	2.0	(1.7–2.3)
Black, non-Hispanic	13,437	1,292	(9.6)	2.5	(2.2–3.0)	13,609	1,228	(9.0)	2.3	(2.0–2.7)
Asian/Pacific Islander	4,050	174	(4.3)	1.1	(0.8–1.5)	4,181	192	(4.6)	1.1	(0.8–1.5)
American Indian/Alaska Native	707	51	(7.2)	1.8	(1.0–3.5)	730	55	(7.5)	1.9	(1.1–3.4)
Sex, by race/ethnicity										
Male										
White, non-Hispanic	45,116	1,638	(3.6)	Ref.	—	44,537	1,704	(3.8)	Ref.	—
Hispanic	7,086	508	(7.2)	2.1	(1.6–2.6)	7,160	577	(8.1)	2.2	(1.8–2.7)
Black, non-Hispanic	5,545	548	(9.9)	2.9	(2.3–3.7)	5,520	512	(9.3)	2.6	(2.1–3.2)
Asian/Pacific Islander	2,536	95	(3.7)	1.0	(0.7–1.6)	2,577	117	(4.6)	1.2	(0.8–1.7)
American Indian/Alaska Native	348	18	(5.3)	1.5	(0.6–3.9)	352	27	(7.8)	2.1	(0.9–4.8)
Female										
White, non-Hispanic	33,628	1,536	(4.6)	Ref.	—	34,795	1,518	(4.4)	Ref.	—
Hispanic	5,523	458	(8.3)	1.9	(1.5–2.4)	5,580	414	(7.4)	1.8	(1.4–2.2)
Black, non-Hispanic	7,892	744	(9.4)	2.2	(1.8–2.7)	8,090	716	(8.9)	2.1	(1.8–2.6)
Asian/Pacific Islander	1,514	79	(5.2)	1.2	(0.7–2.0)	1,604	75	(4.7)	1.1	(0.7–1.8)
American Indian/Alaska Native	359	32	(9.0)	2.1	(0.9–4.8)	378	27	(7.2)	1.7	(0.7–3.9)
Annual income ($)										
≤24,999	46,912	2,771	(9.4)	4.9	(4.1–5.9)	49,240	2,615	(8.5)	3.8	(3.2–4.6)
25,000–49,999	31,170	1,650	(5.3)	2.6	(2.2–3.2)	29,757	1,711	(5.7)	2.5	(2.1–3.1)
50,000–74,999	18,985	700	(3.7)	1.8	(1.4–2.3)	18,557	663	(3.6)	1.5	(1.2–1.9)
≥75,000	31,137	650	(2.1)	Ref.	—	32,558	768	(2.4)	Ref.	—
Education level										
Less than high school	16,779	1,507	(9.0)	2.2	(1.9–2.6)	15,229	1,278	(8.4)	2.1	(1.8–2.5)
High school diploma	30,559	1,564	(5.1)	1.2	(1.1–1.4)	30,692	1,770	(5.8)	1.4	(1.3–1.6)
Any college education	63,354	2,700	(4.3)	Ref.	—	65,884	2,709	(4.1)	Ref.	—
U.S. Census region										
Northeast	23,128	1,096	(5.4)	1.3	(1.0–1.5)	23,316	1,320	(6.5)	1.6	(1.3–1.9)
Midwest	29,202	1,063	(4.2)	1.0	(0.8–1.2)	29,403	1,092	(4.3)	1.0	(0.9–1.3)
South	48,324	2,554	(6.3)	1.5	(1.3–1.7)	49,372	2,332	(5.6)	1.5	(1.2–1.6)
West	27,550	1,058	(4.3)	Ref.	—	28,021	1,013	(4.2)	Ref.	—
Disability status										
Yes	3,657	245	(6.7)	1.3	(1.0–1.8)	3,647	226	(6.2)	1.2	(0.9–1.6)
No	107,035	5,526	(5.2)	Ref.	—	108,151	5,531	(5.1)	Ref.	—
Total	**110,692**	**5,771**	**(5.2)**	—	—	**111,800**	**5,757**	**(5.2)**	—	—

Abbreviations: CI = confidence interval; OR = odds ratio.

* First household member contacted by interviewer who is aged ≥18 years and is an owner or renter of the housing unit.

† Inadequate housing: moderate or severe deficiencies in plumbing, heating, electricity, and upkeep.

§ The total number of inadequate households in this category does not equal the total number of occupied housing units because the multiracial/unknown race category was excluded.

TABLE 2. Selected characteristics of householders* in unhealthy housing[†] — American Housing Survey, United States, 2007 and 2009

	2007					2009				
	Total occupied housing units	Unhealthy housing units				Total occupied housing units	Unhealthy housing units			
Characteristic		**No.**	**(%)**	**Unadjusted odds ratio**	**(95% CI)**		**No.**	**(%)**	**Unadjusted odds ratio**	**(95% CI)**
Sex										
Male	61,206	14,037	(22.9)	Ref.	—	60,721	13,647	(22.5)	Ref.	—
Female	49,486	12,303	(24.9)	1.1	(1.1–1.2)	51,084	12,549	(24.6)	1.1	(1.1–1.2)
Race/Ethnicity[§]										
White, non-Hispanic	78,744	18,446	(23.4)	Ref.	—	79,333	17,992	(22.7)	Ref.	—
Hispanic	12,609	2,754	(21.8)	0.9	(0.8–1.0)	12,739	3,079	(24.2)	1.1	(1.0–1.2)
Black, non-Hispanic	13,437	3,849	(28.6)	1.3	(1.2–1.4)	13,609	3,847	(28.3)	1.3	(1.2–1.5)
Asian/Pacific Islander	4,050	705	(17.4)	0.7	(0.6–0.8)	4,181	720	(17.2)	0.7	(0.6–0.8)
American Indian/Alaska Native	707	218	(30.8)	1.5	(1.0–2.1)	730	233	(31.9)	1.6	(1.1–2.3)
Sex, by race/ethnicity										
Male										
White, non-Hispanic	45,116	10,384	(23.0)	Ref.	—	44,537	9,895	(22.2)	Ref.	—
Hispanic	7,086	1,433	(20.2)	0.9	(0.7–1.0)	7,160	1,625	(22.7)	1.0	(0.9–1.2)
Black, non-Hispanic	5,545	1,524	(27.5)	1.3	(1.1–1.5)	5,520	1,439	(26.1)	1.2	(1.1–1.4)
Asian/Pacific Islander	2,536	398	(15.7)	0.6	(0.5–0.8)	2,577	433	(16.8)	0.7	(0.6–0.9)
American Indian/Alaska Native	348	106	(30.4)	1.5	(0.9–2.4)	352	120	(34.1)	1.8	(1.1–3.0)
Female										
White, non-Hispanic	33,628	8,062	(24.0)	Ref.	—	34,795	8,097	(23.3)	Ref.	—
Hispanic	5,523	1,321	(23.9)	1.0	(0.9–1.2)	5,580	1,454	(26.1)	1.2	(1.0–1.3)
Black, non-Hispanic	7,892	2,325	(29.5)	1.3	(1.2–1.5)	8,090	2,408	(29.8)	1.4	(1.3–1.6)
Asian/Pacific Islander	1,514	308	(20.3)	0.8	(0.6–1.1)	1,604	288	(17.9)	0.7	(0.6–1.0)
American Indian/Alaska Native	359	112	(31.2)	1.4	(0.8–2.5)	378	113	(29.8)	1.4	(0.9–2.3)
Annual income ($)										
≤24,999	46,912	8,004	(27.2)	1.3	(1.2–1.5)	49,240	8,219	(26.6)	1.4	(1.3–1.5)
25,000–49,999	31,170	7,215	(23.1)	1.1	(1.0–1.2)	29,757	7,079	(23.8)	1.2	(1.1–1.3)
50,000–74,999	18,985	4,330	(22.8)	1.1	(1.0–1.2)	18,557	4,065	(21.9)	1.1	(1.0–1.2)
≥75,000	31,137	6,791	(21.8)	Ref.	—	32,558	6,833	(21.0)	Ref.	—
Education level										
Less than high school	16,779	4,283	(25.5)	1.1	(1.0–1.2)	15,229	3,795	(24.9)	1.1	(1.0–1.1)
High school diploma	30,559	6,635	(21.7)	0.9	(0.8–0.9)	30,692	6,829	(22.3)	0.9	(0.9–1.0)
Any college education	63,354	15,422	(24.3)	Ref.	—	65,884	15,572	(23.6)	Ref.	—
U.S. Census region										
Northeast	23,128	6,390	(31.3)	2.0	(1.8–2.1)	23,316	5,538	(27.1)	1.6	(1.4–1.7)
Midwest	29,202	6,426	(25.4)	1.5	(1.3–1.6)	29,403	6,878	(27.1)	1.6	(1.4–1.7)
South	48,324	8,889	(21.9)	1.2	(1.1–1.3)	49,372	9,088	(21.9)	1.2	(1.1–1.3)
West	27,550	4,635	(19.0)	Ref.	—	28,021	4,692	(19.2)	Ref.	
Disability status										
Yes	3,657	987	(27.0)	1.2	(1.0–1.4)	3,647	1,100	(30.2)	1.4	(1.2–1.7)
No	107,035	25,353	(23.7)	Ref.	—	108,151	25,096	(23.2)	Ref.	—
Total	**110,692**	**26,196**	**(23.4)**	—	—	**111,800**	**26,340**	**(23.8)**	—	—

Abbreviations: CI = confidence interval; OR = odds ratio.

* First household member contacted by interviewer who is aged ≥18 years and is an owner or renter of the housing unit.

[†] Unhealthy housing: characteristics (in addition to those of inadequate housing) that negatively affect the health of the occupants (e.g., rodents seen in unit recently, leak in preceding 12 months, peeling paint, or no working smoke alarm).

[§] The total number of inadequate households in this category does not equal the total number of occupied housing units because the multiracial/unknown race category was excluded.

odds of a Hispanic female living in inadequate housing decreased from 2007 to 2009, the odds were still elevated (OR = 1.9 and 1.8, respectively) (Table 1).

In 2009, householders earning an annual salary of ≤$24,999 were almost five times more likely to live in inadequate housing than those earning ≥$75,000 (8.5% versus 2.4%, respectively); however, the odds of householders earning ≤$24,999 and living in inadequate housing decreased significantly from 2007 to 2009 (Table 1). Householders without a high school diploma were more than twice as likely as those with some college education to live in inadequate housing (Table 1). In 2009, for households with at least one person living with a disability, the odds of living in inadequate housing was 1.2 times higher compared with households without a person living with a disability (Table 1).

The proportion of unhealthy housing units did not change significantly from 2007 to 2009. Among housing units classified as unhealthy, the magnitude of disparities varied, especially across racial/ethnic, income, and education level categories. For example, a householder earning <$25,000/year was approximately 4 times more likely to live in an inadequate housing unit as a householder making ≥$75,000 a year but was only 1.3 times more likely to live in an unhealthy, as opposed to an inadequate, home. The decrease likely can be attributed to more common characteristics associated with unhealthy homes (e.g., presence of rodents and interior water leaks), compared with inadequate homes. For example, in 2009, approximately 36.9% of surveyed respondents in housing units indicated observing rodents recently, and 10% reported having had a water leak during the previous 12 months (Table 3).

The 2007–2009 AHS data indicate that the percentage of inadequate housing units in the United States is relatively stable and that the proportion of families living in inadequate housing declined among demographic groups with the highest percentages. However, the disparity by race/ethnicity, socioeconomic status, and education level is still substantial. Interventions to reduce this disparity even further are available. Specific housing interventions that increase the health and safety of housing have been demonstrated to reduce disease among residents (*7*). For example, mitigation of active radon (which is not measured by AHS) in areas at high risk for contamination has been reported to reduce radon to acceptable levels (i.e., <4 picocuries per liter [pCi/L]), in 95% of remediated homes, with 69% of such homes reduced to levels <2 pCi/L (*8*). In addition, integrated pest management to reduce exposure to pesticide residue has resulted in significant decreases in both cockroach infestations and levels of pyrethroid insecticides in indoor air samples (p = 0.02) (*9*).

Vigorous efforts to decrease disparities in access to healthy housing will have the immediate effect of decreasing disparities in health status. Among the approximately 110 million housing units in the United States, approximately 5.8 million are classified as inadequate and 23.4 million are considered unhealthy. Inadequate and unhealthy housing disproportionately affects the populations that have the fewest resources (e.g., persons with lower income and limited education). Substantial actions are needed to reduce the overall proportion of inadequate and unhealthy housing among these persons. Results presented in this report can assist organizations in focusing prevention programs and interventions for these populations.

The findings in this report are subject to at least five limitations. First, data were collected through a home visit or a telephone survey. Because data are self-reported, certain demographic characteristics (e.g., income level) might have been reported incorrectly, resulting in possible misclassification. In addition, the results might overestimate or underestimate the actual number of persons living in inadequate or unhealthy homes. AHS has attempted to survey the same, or nearly the same, sample of houses for each cycle since the survey began. Therefore, the survey administrators are persistent in their efforts to contact residents, substantially reducing typical nonresponse problems associated with phone surveys. Second, certain types of living quarters were excluded from the sample, including transient accommodations, barracks for workers or members of the armed forces, and institutional accommodations (e.g., dormitories, wards, and rooming houses). Third, the replicate weights are not made public; therefore, CIs calculated by using the probability weights included in the data set are likely narrower than they would be if the replicate weights could be used. Fourth, only 2 years of data were analyzed, which makes interpretation of trends difficult. Last, AHS does not link questions regarding housing to any other surveys containing health status information. CDC is working with HUD to include health status questions in the 2011 survey.

Although AHS does not link questions regarding housing to any other surveys containing health status information, the connection between health and both inadequate and unhealthy housing has been well-documented (*10–14*). Persons living in inadequate or unhealthy housing as defined in this analysis might be more likely to be exposed to pests and mold that exacerbate asthma (*10,11*) as well as to lead paint hazards that limit the intellectual development of children (*12*). They might also be more likely to die in house fires as a result of faulty or missing smoke detectors (*13,14*). However, whether healthy, safe, and affordable housing benefits the well-being of its inhabitants beyond reducing exposures to toxins and offering protection from the risk for death by fire is unclear. The effect of housing on mental health, obesity, and healthy aging is also an area in need of additional research.

TABLE 3. Selected characteristics of householders,* by specific unhealthy housing characteristics — American Housing Survey, United States, 2009

Characteristics	Total occupied housing units	Rodent seen in unit recently				Leaks during preceding 12 months			
		No.	(%)	Unadjusted odds ratio	(95% CI)	No.	(%)	Unadjusted odds ratio	(95% CI)
Sex									
Male	60,721	3,716	(35.2)	Ref.	—	5,748	(9.6)	Ref.	—
Female	51,084	3,219	(38.9)	1.2	(1.0–1.3)	5,215	(10.3)	1.1	(1.0–1.2)
Race/Ethnicity[†]									
White, non-Hispanic	51,084	4,692	(33.4)	Ref.	—	8,077	(10.3)	Ref.	—
Hispanic	79,333	849	(51.3)	2.1	(1.7–2.6)	997	(7.9)	0.7	(0.6–0.9)
Black, non-Hispanic	12,739	1,028	(44.8)	1.6	(1.3–2.0)	1,447	(10.7)	1.1	(0.9–1.2)
Asian/Pacific Islander	13,609	172	(43.9)	1.6	(1.1–2.3)	229	(5.5)	0.5	(0.4–0.7)
American Indian/Alaska Native	4,181	77	(53.0)	2.3	(1.1–4.7)	81	(11.2)	1.1	(0.7–1.8)
Sex, by race/ethnicity									
Male									
White, non-Hispanic	44,537	2,739	(33.0)	Ref.	—	4,439	(10.1)	Ref.	—
Hispanic	7,160	398	(44.8)	1.7	(1.2–2.2)	545	(7.7)	0.7	(0.6–0.9)
Black, non-Hispanic	5,520	353	(41.0)	1.4	(1.0–1.9)	561	(10.3)	1.0	(0.8–1.2)
Asian/Pacific Islander	2,577	115	(46.3)	1.8	(1.1–2.9)	113	(4.4)	0.4	(0.3–0.6)
American Indian/Alaska Native	352	55	(65.1)	3.8	(1.3–11.1)	42	(11.9)	1.2	(0.6–2.4)
Female									
White, non-Hispanic	34,795	1,953	(34.0)	Ref.	—	3,639	(10.6)	Ref.	—
Hispanic	5,580	451	(59.0)	2.8	(2.0–3.9)	452	(8.1)	0.8	(0.6–0.9)
Black, non-Hispanic	8,090	675	(47.1)	1.7	(1.3–2.2)	885	(11.1)	1.1	(0.9–1.2)
Asian/Pacific Islander	1,604	57	(39.9)	1.3	(0.7–2.5)	116	(7.3)	0.7	(0.5–1.0)
American Indian/Alaska Native	378	22	(36.1)	1.1	(0.4–3.3)	39	(10.5)	1.0	(0.5–1.9)
Annual income ($)									
≤24,999	49,240	2,388	(45.1)	1.9	(1.6–2.2)	2,957	(9.7)	1.0	(0.9–1.1)
25,000–49,999	29,757	1,913	(38.0)	1.4	(1.2–1.7)	2,915	(9.9)	1.0	(0.9–1.1)
50,000–74,999	18,557	971	(32.1)	1.1	(0.9–1.3)	1,881	(10.3)	1.0	(0.9–1.2)
≥75,000	32,558	1,663	(30.5)	Ref.	—	3,209	(9.9)	Ref.	—
Education level									
Less than high school	15,229	1,270	(44.1)	1.5	(1.3–1.8)	1,297	(8.6)	0.8	(0.7–0.9)
High school diploma	30,692	1,955	(38.2)	1.2	(1.0–1.4)	2,698	(8.9)	0.8	(0.7–0.9)
Any college education	65,884	3,709	(34.3)	Ref.	—	6,969	(10.7)	Ref.	—
U.S. Census region									
Northeast	23,316	1,850	(43.1)	1.6	(1.3–2.0)	2,285	(11.3)	1.8	(1.6–2.1)
Midwest	29,403	1,571	(33.9)	1.1	(0.9–1.4)	3,694	(14.7)	2.4	(2.1–2.8)
South	49,372	2,485	(37.3)	1.3	(1.0–1.6)	3,383	(8.3)	1.3	(1.1–1.5)
West	28,021	1,029	(31.9)	Ref.	—	1,600	(6.6)	Ref.	
Disability status									
Yes	3,647	289	(41.6)	1.2	(0.9–1.7)	469	(12.9)	1.4	(1.1–1.7)
No	108,151	6,646	(36.7)	Ref.	—	10,494	(9.8)	Ref.	—
Total	**111,800**	**6,935**	**(36.9)**	—	—	**10,960**	**(9.9)**	—	—

Abbreviations: CI = confidence interval; OR = odds ratio.

* First household member contacted by interviewer who is aged ≥18 years and is an owner or renter of the housing unit.

[†] The total number of households in this category does not equal the total number of occupied housing units because the multiracial/unknown race category was excluded.

TABLE 3. ***Continued.*** **Selected characteristics of householders,* by specific unhealthy housing characteristics — American Housing Survey, United States, 2009**

	Peeling paint				No working smoke alarm			
Characteristics	**No.**	**(%)**	**Unadjusted odds ratio**	**(95% CI)**	**No.**	**(%)**	**Unadjusted odds ratio**	**(95% CI)**
Sex								
Male	1,170	(1.9)	Ref.	—	3,352	(5.6)	Ref.	—
Female	1,207	(2.4)	1.2	(1.0–1.5)	2,806	(5.6)	1.2	(1.0–1.5)
Race/Ethnicity†								
White, non-Hispanic	1,471	(1.9)	Ref.		3,542	(4.5)	Ref.	—
Hispanic	311	(2.4)	1.3	(1.0–1.7)	1,447	(11.4)	2.7	(2.4–3.1)
Black, non-Hispanic	480	(3.5)	1.9	(1.5–2.4)	795	(5.9)	1.3	(1.1–1.6)
Asian/Pacific Islander	38	(0.9)	0.5	(0.3–0.9)	212	(5.2)	1.2	(0.9–1.5)
American Indian/Alaska Native	34	(4.7)	2.6	(1.2–5.7)	78	(10.8)	2.6	(1.5–4.4)
Sex, by race/ethnicity								
Male								
White, non-Hispanic	780	(1.8)	Ref.	—	1,907	(4.3)	Ref.	—
Hispanic	155	(2.2)	1.2	(0.9–1.8)	845	(11.9)	3.0	(2.5–3.6)
Black, non-Hispanic	189	(3.4)	2.0	(1.4–2.9)	403	(7.3)	1.8	(1.4–2.2)
Asian/Pacific Islander	21	(0.8)	0.5	(0.2–1.1)	117	(4.6)	1.1	(0.7–1.6)
American Indian/Alaska Native	20	(5.7)	3.4	(1.1–10.2)	44	(12.6)	3.2	(1.5–6.7)
Female								
White, non-Hispanic	691	(2.0)	Ref.	—	1,635	(4.8)	Ref.	—
Hispanic	156	(2.8)	1.4	(1.0–2.0)	601	(10.8)	2.4	(2.0–3.0)
Black, non-Hispanic	291	(3.6)	1.8	(1.4–2.5)	393	(4.9)	1.0	(0.8–1.3)
Asian/Pacific Islander	18	(1.1)	0.6	(0.2–1.4)	96	(6.0)	1.3	(0.8–2.0)
American Indian/Alaska Native	14	(3.7)	1.9	(0.6–5.5)	34	(9.1)	2.0	(0.9–4.3)
Annual income ($)								
≤24,999	1,969	(4.0)	3.4	(2.7–4.2)	5,679	(12.6)	5.4	(4.6–6.3)
25,000–49,999	639	(2.1)	1.8	(1.4–2.3)	1,826	(6.2)	2.5	(2.1–3.0)
50,000–74,999	332	(1.8)	1.5	(1.1–2.0)	752	(4.1)	1.6	(1.3–2.0)
≥75,000	399	(1.2)	Ref.	—	843	(2.6)	Ref.	—
Education level								
Less than high school	446	(2.9)	1.5	(1.2–1.9)	1,800	(12.0)	3.6	(3.1–4.1)
High school diploma	636	(2.1)	1.1	(0.9–1.3)	1,962	(6.5)	1.8	(1.6–2.1)
Any college education	1,295	(2.0)	Ref.	—	2,396	(3.7)	Ref.	—
U.S. Census region								
Northeast	648	(2.8)	1.5	(1.2–2.0)	1,093	(4.9)	0.7	(0.6–0.8)
Midwest	980	(3.3)	1.9	(1.5–2.3)	1,694	(6.0)	0.8	(0.7–1.0)
South	1,199	(2.4)	1.3	(1.1–1.7)	4,382	(9.3)	1.3	(1.2–1.5)
West	512	(1.8)	Ref.	—	1,931	(7.1)	Ref.	—
Disability status								
Yes	148	(4.1)	2.0	(1.3–3.0)	194	(5.4)	1.0	(0.7–1.3)
No	2,230	(2.1)	Ref.	—	5,961	(5.6)	Ref.	—
Total	**2,378**	**(2.1)**	—	—	**6,157**	**(5.6)**	—	—

Abbreviations: CI = confidence interval; OR = odds ratio.

* First household member contacted by interviewer who is aged ≥18 years and is an owner or renter of the housing unit.

† The total number of households in this category does not equal the total number of occupied housing units because the multiracial/unknown race category was excluded.

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Unhealthy Air Quality — United States, 2006–2009

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Particulate matter and ozone are two well-characterized air pollutants that can affect health and are monitored by the U.S. Environmental Protection Agency (EPA). Particulate matter (solid or liquid particles suspended in the air) varies widely in size and chemical composition and can include smoke, fumes, soot, and combustion by-products, as well as natural particles (e.g., wind-blown dust, pollen, and sea salt) (*1,2*). Particulate matter therefore represents a complex class of air pollutants that differ from other gaseous air pollutants (e.g., ozone). The transport and effect of particulate matter, both in the atmosphere and in the human respiratory tract, are governed principally by particulate size, shape, and density. Individual particles are characterized by their equivalent aerodynamic diameter: coarse particulate matter (2.5–10 μm); fine particulate matter, or $PM_{2.5}$ (0.1–2.5 μm); and ultrafine particulate matter (<0.1 μm). Ozone is a gas that occurs naturally in the stratosphere, approximately 10–30 miles above the earth's surface, protecting the earth from the sun's ultraviolet rays. Ozone also exists at ground level and is the primary component of smog. At ground level, ozone is created when specific pollutants react in the presence of sunlight. In urban areas, vehicular and industrial emissions are chief contributors to ozone production. Ground-level ozone adversely affects health and damages the environment.

The association between outdoor particulate matter concentrations and acute and chronic adverse health outcomes includes premature death, lung cancer, exacerbation of respiratory and cardiovascular disease, and increased risks for cardiovascular morbidity (e.g., myocardial infarction and arrhythmia) (*1–6*). Data indicate that fine particulate matter is the size fraction most strongly associated with these observed health effects (*1–7*). Populations most susceptible to these exposures include older adults and children, as well as persons with heart and lung disease. National Ambient Air Quality Standards (NAAQS) were set forth in the Clean Air Act Amendments of 1970* requiring EPA to set air quality standards for specific pollutants, such as $PM_{2.5}$ and ozone, to protect the health of the general public, as well as that of sensitive populations. States that do not meet the standards are subject to additional regulatory requirements and must develop a state implementation plan to meet the standards. State implementation plans might include control requirements and limits on emissions. In 2006, on the basis of increasing evidence of the effects of $PM_{2.5}$ on human health, EPA revised its 24-hour NAAQS from 65 $\mu g/m^3$ to 35 $\mu g/m^3$. Throughout the United States, $PM_{2.5}$ concentrations have been decreasing; more counties were in compliance with national pollution standards as of 2008 compared with previous years (*8*). During 2001–2008, the average annual and 24-hour $PM_{2.5}$ concentrations declined by 17% and 19%, respectively (*8*).

Short-term exposures to ozone have been associated with an increase in mortality as well as cardiovascular- and respiratory-related hospitalizations (*9–11*). Ozone exposure can result in lung and throat irritation, lung inflammation, wheezing, and difficulty breathing (*11–13*). Exposure to ozone also exacerbates bronchitis, emphysema, and asthma (*11,14,15*). Populations at risk for ozone-related health effects have been characterized as those that typically spend long periods outdoors (e.g., persons with outdoor occupations and athletes), as well as sensitive groups, including infants and children, older persons, and persons with respiratory or cardiovascular disease (including asthma) (*16–21*).

In 2008, EPA decreased NAAQS for ozone to an 8-hour standard of 75 parts per billion (ppb) (0.075 parts per million [ppm]) from the level of 80 ppb (0.08 ppm) set in 1997. In 2008, the national average concentration of ozone was 14% lower than in 1990. This reduction has been attributed to decreasing levels of summer-time emissions of nitrogen oxides and volatile organic compounds (two key precursors to the formation of ozone) from transportation and fuel combustion sources (*8*).

To characterize the populations who live in areas with $PM_{2.5}$ and ozone levels that exceed those allowed by the NAAQS (i.e., nonattainment areas), CDC categorized the proportions of populations who live in these areas by race/ethnicity, level of education attainment, and household income, as represented by the poverty to income ratio (PIR). Other factors, including disability status, were not examined because of limited data. Relative difference (percentage difference) was calculated by dividing the difference between the referent category and each category in the classifying variable by the value in the referent category and multiplying by 100.The referent groups selected were consistent with referent groups used in national survey summaries.

Three data sources were used for this assessment: 1) population estimates for 2007 and 2008 from the U.S. Census Bureau Population Estimates Program for U.S. counties, 2) 3-year education and income estimates from the American Community Survey (2006–2008), and 3) data on nonattainment counties for $PM_{2.5}$ (2006–2008) and ozone (2007–2009) obtained from EPA (http://www.epa.gov/airtrends/values.html). EPA areas are

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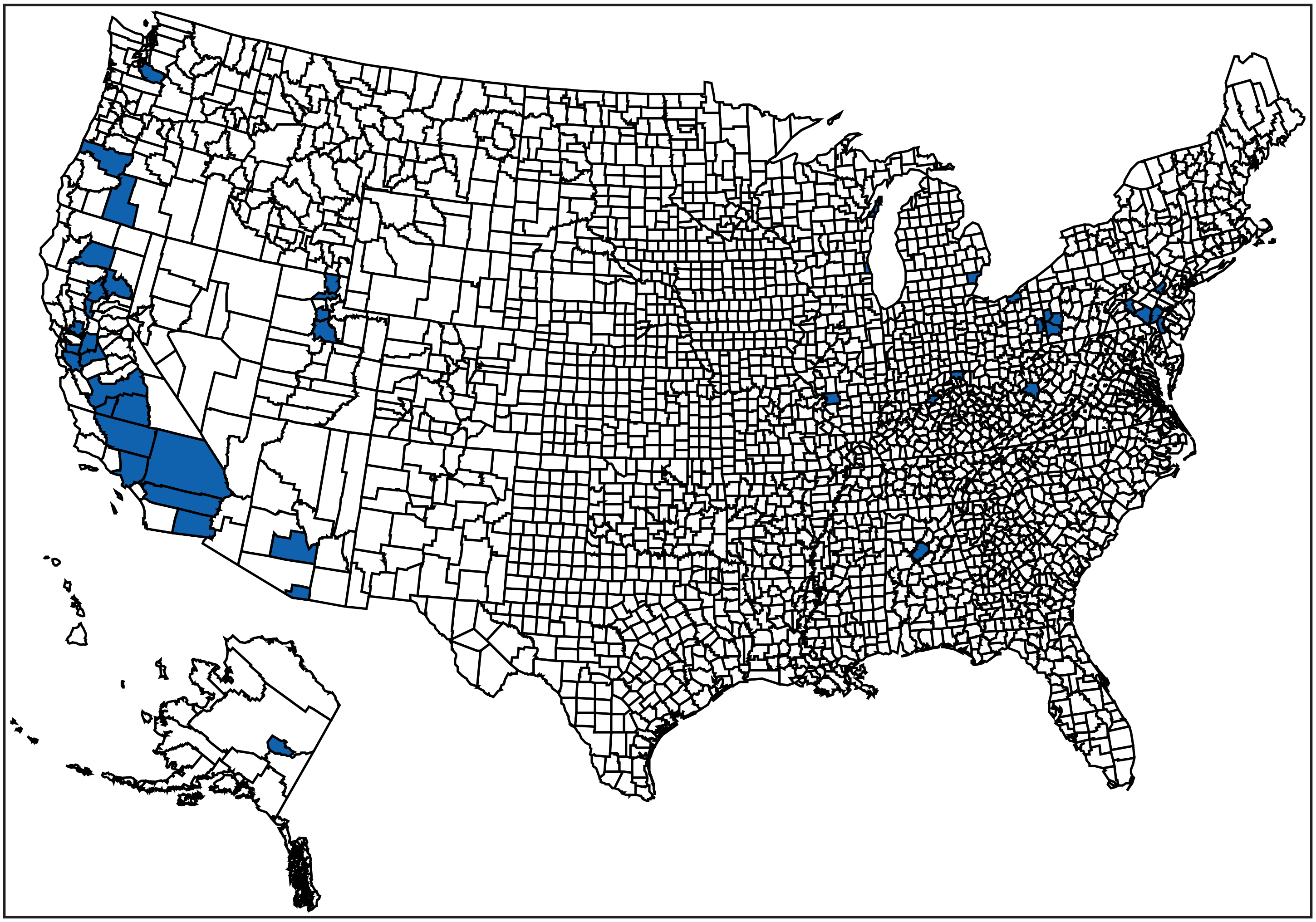
*Clean Air Act Amendments of 1970. Pub. L. No. 91-604, 81 Stat. 486 (December 31, 1970).

designated as nonattainment on the basis of EPA design values (i.e., statistics derived from multiple years of data that describe the ambient air quality status of a given area relative to the level of the NAAQS). In this report, counties in nonattainment represent a location that had a design value for the 24-hour $PM_{2.5}$ standard that exceeded the 2006 24-hour $PM_{2.5}$ standard of 35 μg/m^3; the design value was calculated as the 3-year average (2006–2008) of annual 98th percentile $PM_{2.5}$ concentrations that were valid (i.e., 24-hour averages that were available for at least 75% of possible hours in a day). For ozone, counties of nonattainment had a design value (calculated as the 3-year average [2007–2009] of the annual fourth-highest daily maximum 8-hour ozone concentration) that was greater than the 2008 8-hour ozone standard of 75 ppb.

The percentage of the population living in 24-hour $PM_{2.5}$ or in 8-hour ozone nonattainment counties were summarized for each category of each demographic group. Relative differences between categories were calculated as the percentage difference of each category compared with a referent category.

A total of 53 (23.3%) of 227 counties were nonattainment counties for the 2006 24-hour $PM_{2.5}$ standard (Figure 1), representing 13.6% of the U.S population in 2007 (2007 U.S. population: 301,621,157). Twenty-six (49.1%) of these counties were classified as large central metropolitan counties or large fringe metropolitan counties (i.e., counties in a metropolitan statistical area [MSA] with a population of ≥1 million). Four counties (7.5%) were classified as nonmetropolitan (*22*), and the remaining 23 counties were classified as small to medium metropolitan counties (MSA population of 50,000–999,000). During 2007–2009, a total of 201 counties, or 36.2% of the U.S. population in 2008 (2008 U.S. population: 304,059,724), lived in nonattainment counties for 2008 8-hour ozone standard (Figure 2). The majority of counties (158 [78.6%]) in nonattainment for ozone were classified as counties in MSAs with populations of at least 250,000, of which 111 (31.5%) represented counties classified as large central metro or large fringe metro, consisting of ≥1 million population. Twenty-seven counties (13.4%) were classified as nonmetropolitan, and the remaining 16 counties

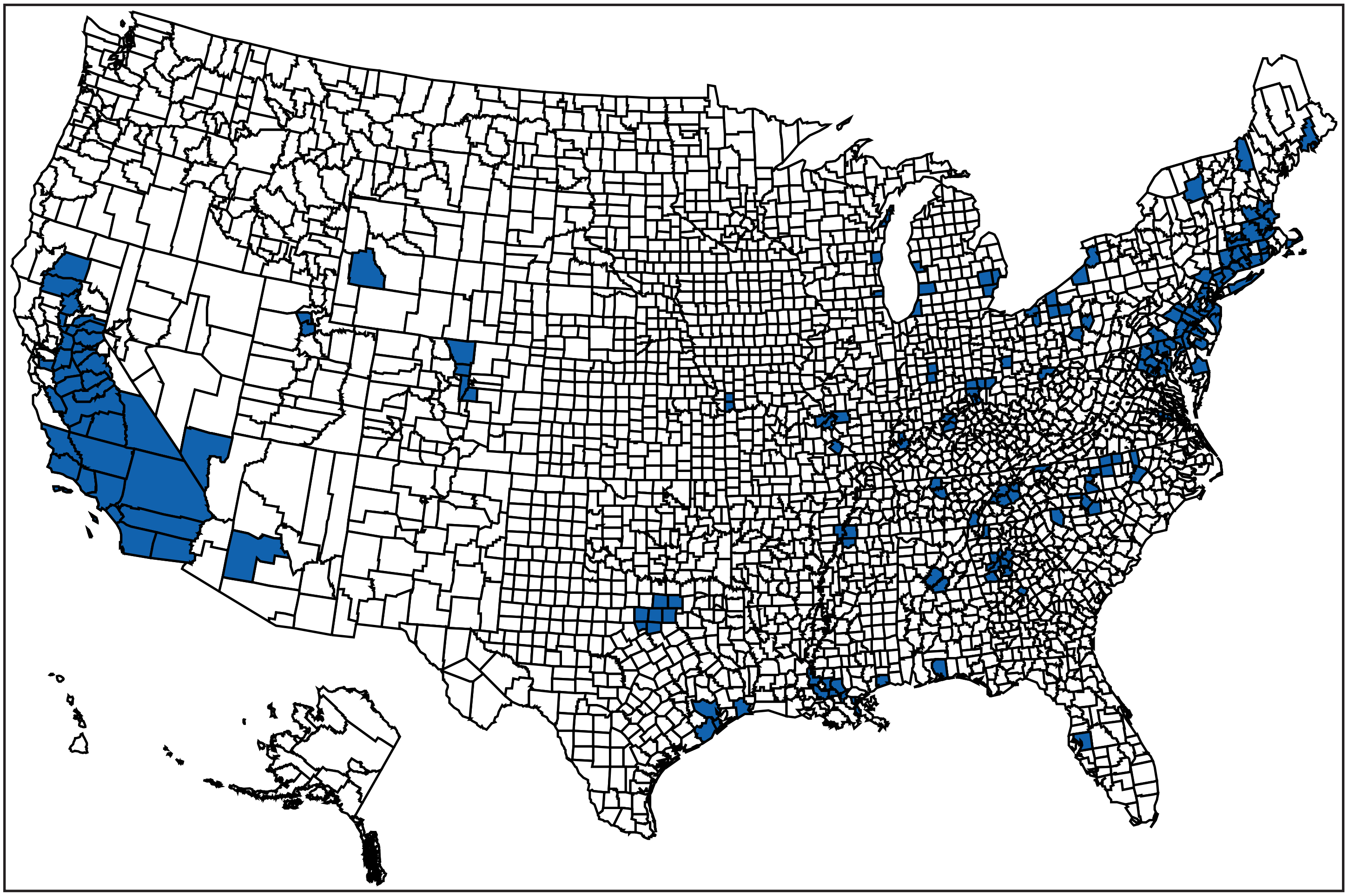
FIGURE 1. Counties in 24-hour fine particulate matter ($PM_{2.5}$) nonattainment areas* — United States, 2006–2008



Source: U.S. Environmental Protection Agency (EPA).

* Counties that did not meet the EPA 2006 $PM_{2.5}$ standard of 35 μg/m^3 from 2006–2008.

FIGURE 2. Counties in 8-hour ozone nonattainment areas* — United States, 2007–2009



Source: U.S. Environmental Protection Agency (EPA).
* Counties that did not meet the EPA 2008 ozone standard of 75 ppb from 2007–2009.

were classified as small metropolitan counties (MSA population of 50,000–249,999).

Assessment of the data by race/ethnicity indicates that Asians (26.2%) and Hispanics (26.6%) had the greatest percentage of residence in 2006 24-hour $PM_{2.5}$ nonattainment counties (Table). The relative difference between non-Hispanic whites and several racial/ethnic groups living in the areas was >100%: Asians (169%), Native Hawaiians/other Pacific Islanders (125%), and Hispanics (165%).

A similar pattern was observed in the proportion of Asian (50.2%) and Hispanic (48.4%) populations living in 2008 8-hour ozone nonattainment counties (Table). Compared with non-Hispanic whites, Asians were 57% more likely and Hispanics were 51% more likely to live in a nonattainment county.

The percentages of populations living in nonattainment counties also varied by household income and education level. The highest income population (PIR = 3 to ≥5) had the greatest percentage of persons in 24-hour $PM_{2.5}$ nonattainment counties (13.3%) and 8-hour ozone nonattainment counties (41.1%). Similarly, compared with the referent group (PIR ≤1 [poor]), the highest income population was 2% more likely to live in a $PM_{2.5}$ nonattainment county and 34% more likely to live in an ozone nonattainment county.

The greatest percentage of persons living in $PM_{2.5}$ nonattainment counties were those with less than a high school education (16.4%). In contrast, the greatest percentage of persons in ozone nonattainment counties was college graduates or those who received advanced degrees (39.6%). Compared with persons who received less than a high school education, persons who received a high school diploma were 28% less likely to live in a nonattainment $PM_{2.5}$ county, and persons who received an advanced degree were 10% more likely to live in an ozone nonattainment county. No differences were observed between the percentages of males and females living in $PM_{2.5}$ nonattainment counties or ozone nonattainment counties.

The findings in this report are subject to at least two limitations. First, residence in a nonattainment county does not necessarily indicate a person's exposure or potential severity of exposure to air pollution. Second, ambient air monitoring sites often are located in counties that are more populated and as a result tend be more representative of air quality in urban areas and might not reflect conditions outside the urban monitoring areas. Likewise, demo-

TABLE. Percentage and relative difference of populations living in fine particulate matter ($PM_{2.5}$) and ozone nonattainment[*] counties, by selected characteristics — United States, 2006–2008 and 2007–2009

	$PM_{2.5}$ (2006–2008)		Ozone (2007–2009)	
Characteristic	Population[†] in nonattainment counties (%)	Relative difference[§] (%)	Population[¶] in nonattainment counties (%)	Relative difference[§] (%)
Race/Ethnicity				
White, non-Hispanic	9.7	Ref.	32.0	Ref.
Black, non-Hispanic	15.2	56	40.0	25
American Indian/Alaska Native	8.2	–16	18.6	–42
Asian	26.2	169	50.2	57
Native Hawaiian/other Pacific Islander	22.0	125	36.5	14
Non-Hispanic, multiple races	15.2	56	36.1	13
Hispanic	26.6	163	48.4	51
Household income (PIR)[**]				
<1 (poor)	13.1	Ref.	30.6	Ref.
1 to <2 (near-poor)	12.2	–7	32.2	5
2 to <3 (middle income)	12.2	–6	34.1	12
3 to ≥5 (high income)	13.3	2	41.1	34
Education level[**]				
Less than high school	16.4	Ref.	36.1	Ref.
High school diploma (including GED)	11.9	–28	31.9	–12
Some college education	12.9	–22	35.2	–3
College graduate or higher	13.2	–20	39.6	10

Abbreviation: GED = general equivalency diploma; PIR = poverty to income ratio.

[*] Counties that did not meet the National Ambient Air Quality Standards set forth in the Clean Air Act Amendments of 1970 for the 2006 24-hour $PM_{2.5}$ standard of 35 $\mu g/m^3$ from 2006–2008 and the 2008 8-hour ozone standard of 75 ppb from 2007–2009.

[†] Based on 2007 population (U.S. Census).

[§] Relative difference (percentage difference) was calculated by dividing the difference between the referent category and each category in the classifying variable by the value in the referent category and multiplying by 100.

[¶] Based on 2008 population (U.S. Census).

[**] Based on data from 2006–2008.

graphic trends observed in this analysis are more likely to closely reflect residents in urban areas than those in rural areas.

The results in this report indicate that minority groups, including Asians and Hispanics, were more likely to live in $PM_{2.5}$ and ozone nonattainment counties. This finding might be a result of the larger percentage of these populations that live in urban areas (*23*). In 2007, an estimated 55% of all Asians lived in the 10 metropolitan areas with the largest Asian populations, and 49% of all Hispanics lived in the 10 metro areas with the largest Hispanic populations. The majority of these metropolitan areas (e.g., Los Angeles, California, and New York City, New York) were also designated as nonattainment areas for $PM_{2.5}$ and ozone (*24*). In addition, 15.4% of the nonattainment counties for either or both pollutants were in California, where Asians represented 12.5%, and Hispanics represented 36.6% of the total population in California 2008 (*25*).

Study of other demographic characteristics indicates that persons in the highest income category and in the highest and lowest categories of education attainment have the largest percentages of persons in $PM_{2.5}$ and ozone nonattainment counties. These results also likely reflect the demographic distribution of persons who live in predominantly urban areas. The populations in urban centers and metropolitan areas tend to be diverse, with areas of wealth integrated with those in poverty (*26–30*).

Nonattainment areas often are affected by pollution sources such as heavy traffic and other environmental hazards (e.g., industrial emissions) that can affect health. A growing body of research demonstrates that proximity to sources such as traffic can have adverse health effects, especially with respect to vehicular emissions, including $PM_{2.5}$. In a recent review, the Health Effects Institute concluded that sufficient evidence exists to indicate that traffic exposure exacerbates asthma among children, and suggestive but not sufficient evidence indicates that these exposures cause other adverse health effects (e.g., impaired lung function and increased cardiovascular morbidity and mortality) (*31*). Zones most affected by traffic-related exposures are estimated to be 300–500 m away from major roads (i.e., roads with intermediate levels of traffic volumes that are less than highways, freeways, and motorways);

calculated for large cities, >33% of the U.S. population live in these affected areas (*31*).

Certain segments of the population, such as very young children and older adults, are particularly susceptible to the effects of air pollution. Because industrial facilities and motor vehicles are key contributors to the levels of $PM_{2.5}$ and ozone production (*7,11*), public health efforts should continue to focus on measures to reduce sources of pollution (e.g., promotion of mass transit and development of technology to reduce mobile and stationary source emissions), which in turn should reduce population exposures to unhealthy air quality (*32–35*).

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Health-Care Access and Preventive Health Services

Health Insurance Coverage — United States, 2004 and 2008

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During 1987–2006, the estimated number of U.S. residents without health insurance increased from 31 million in 1987 to 47 million in 2006 (*1*) and is projected to reach 52 million by the end of 2010 (*2*). The 2010 estimate does not directly take into account the additional effect of job losses, which are likely to add millions more to the number of uninsured persons (*2*). Chronically ill patients without insurance are more likely than those with coverage 1) not to have visited a health-care professional and 2) either not to have a standard site for care or to identify their standard site of care as an emergency department (*3*). Lack of health insurance is associated with reduced use of preventive services and medical treatment, particularly among racial/ethnic minorities (*4*).

To identify disparities in lack of health insurance coverage among adults aged 18–64 years for different demographic and socioeconomically disadvantaged groups over time, CDC analyzed data from the 2004 and 2008 National Health Interview Survey (NHIS). NHIS is a cross-sectional survey of a representative sample of the civilian, noninstitutionalized U.S. household population. Respondents were considered uninsured if they did not have any private health insurance, Medicare, Medicaid, State Children's Health Insurance Program coverage, state-sponsored or other government-sponsored health plan, or a military health-care plan at the time of the interview. Persons also were considered uninsured if they reported having only Indian Health Service coverage or a private plan that paid for only one type of service (e.g., unintentional injuries or dental care).

Using the lowest population group-specific rate of lack of insurance as the reference value, CDC calculated absolute and relative percentage differences between categories for each population domain. The relative percentage difference is the absolute difference between the rates of two population groups being compared as a percentage of the reference value. The 95% confidence intervals for uninsured rates were estimated by using SAS version 9.02 (SAS Institute, Inc., Cary, North Carolina, 2010) (*5*). Pair-wise differences by sex, age group, race/ethnicity, disability status, educational achievement, and differences between 2004 and 2008 were tested by the z-statistic (one-tailed) at the 0.05 level of significance. A covariance of zero between estimates in conducting these tests was assumed. When testing differences within demographic groups, the Bonferroni method was used to account for multiple comparisons. If κ comparisons existed within a group, the level of significance was set to $0.05/\kappa$. Estimates with relative standard of >20% were considered unreliable.

Significant disparities in uninsured rates were identified in all the demographic and socioeconomic groups. Statistically significant disparities by sex ($p<0.001$) existed during both 2004 and 2008, with a higher percentage of males being uninsured (2004: males, 21.2%; females, 17.3%; 2008: males, 22.2%; females, 17.3%) (Table 1). The uninsured rate for young adults aged 18–34 years was approximately double the uninsured rate for adults aged 45–64 years (2004: ages 18–34 years, 26.3%; 45–64 years, 12.7%; 2008: ages 18–34 years, 27.1%; 45–64 years, 13.6%). Uninsured rates for all the age groups analyzed were significantly higher ($p<0.001$), compared with adults aged 45–64 years.

Approximately two of every five persons of Hispanic ethnicity and one of five non-Hispanic blacks were classified as uninsured during both 2004 and 2008. Both these groups had significantly higher ($p<0.001$) uninsured rates (average rates 42.7% and 22.6%, respectively) for 2004 and 2008 compared with Asians/Pacific Islanders and non-Hispanic whites (average rates 16% and 14.1%, respectively). No significant difference in uninsured rates existed between non-Hispanic whites and Asians/Pacific Islanders. Approximately half of the uninsured adults during 2008 were non-Hispanic whites (Table 2). Hispanics accounted for one third of the uninsured population.

Uninsured rates for poor (those living at or below the federal poverty level [FPL]) and near-poor (those at <3.0 times FPL) ranged from 30% to 39% during both 2004 and 2008, respectively, and these rates were significantly higher ($p<0.001$), compared with the uninsured rate among the nonpoor (those at ≥3.0 times FPL). Approximately half (47.9%) of uninsured adults were near-poor. During 2008, income for the near-poor ranged from $22,000 to $66,000 per year for a family of four. Unlike children with similar family incomes, the majority of these adults were ineligible for Medicaid because health insurance for the poor varies by state-specific eligibility criteria. Only the uninsured rate for the highest income group increased significantly ($p = 0.006$) from 2004 (7.5%) to 2008 (8.9%).

Regarding educational achievement, all groups compared with college graduates had significantly higher uninsured rates ($p<0.001$). Uninsured rates for high school graduates increased significantly ($p = 0.003$) from 2004 (21.5%) to 2008 (24.4%). The uninsured rate for persons without a disability (2004: 19.9%; 2008: 20.5%) was significantly higher ($p<0.001$), compared with persons with a disability (2004: 17.3%; 2008: 17.7%).

TABLE 1. Percentage of respondents aged 18–64 years without health insurance, by selected demographic characteristics — National Health Interview Survey, United States, 2004 and 2008

	2004			2008			
Characteristic	**%**	**(95% CI)**	**Relative difference (%)**	**%**	**(95% CI)**	**Relative difference (%)**	**Absolute change in uninsured rates from 2004 to 2008 (%)[*]**
Sex							
Males	21.2	(20.1–22.4)	22.5	22.2	(21.0–23.5)	28.3	4.7
Females	17.3	(16.4–18.2)	—[†]	17.3	(16.2–18.3)	—	0
Age group (yrs)							
18–24	29.0	(26.6–31.4)	128.3	27.9	(25.4–30.4)	105.1	–3.8
25–34	25.3	(23.6–27.0)	99.2	26.6	(24.7–28.5)	95.6	5.1
35–44	17.9	(16.7–19.2)	40.9	18.7	(17.3–20.2)	37.5	4.5
45–64	12.7	(11.8–13.6)	—	13.6	(12.6–14.6)	—	7.1
Poverty status[§]							
Poor	39.1	(36.1–32.1)	421.3	37.0	(34.0–40.0)	315.1	–5.4
Near-poor	30.4	(28.8–32.0)	305.3	30.5	(28.8–32.2)	242.2	0.3
Nonpoor	7.5	(6.7–8.2)	—	8.9	(8.1–9.8)	—	18.8
Race/Ethnicity							
Hispanic	43.9	(41.9–45.8)	220.4	41.6	(38.8–44.4)	197.1	–5.2
White, non-Hispanic	13.7	(12.9–14.5)	—	14.6	(13.7–15.5)	4.3	6.6
Black, non-Hispanic	23.2	(21.0–25.4)	69.3	22.1	(20.3–23.9)	57.9	–4.7
American Indian/Alaska Native	32.5[¶]			33.7[¶]			
Asian/Pacific Islander	18.1	(14.0–22.3)	32.1	14.0	(11.2–16.9)	—	–22.7
Other, non-Hispanic and multiple race	13.4[¶]			20.1[¶]			
Disability status							
Persons with a disability	17.3	(16.0–18.6)	—	17.7	(16.4–19.0)	—	2.3
Persons without a disability	19.9	(19.0–20.8)	15.0	20.5	(19.4–21.5)	15.8	3.0
Educational achievement							
Less than high school	41.2	(39.0–43.5)	497.1	40.5	(37.6–43.3)	400.0	–1.7
High school graduate or equivalent	21.5	(20.1–22.8)	211.6	24.4	(22.8–26.1)	201.2	13.5
Some college	16.6	(15.4–17.8)	140.6	16.6	(15.4–17.7)	104.9	0
College graduate	6.9	(6.0–7.8)	—	8.1	(7.1–9.0)	—	17.4

Abbreviation: CI = confidence interval.

[*] The value is computed as (Col 4 – Col 1) / Col 1* 100 and interpreted as follows: for example, during 2004–2008, the percentage of males without health insurance increased by 4.7 percentage points above the value in 2004.

[†] Referent.

[§] Poor = ≤1.0 times the federal poverty level (FPL), near-poor = 1.0–2.9 times FPL, and nonpoor = ≥3.0 times FPL. FPL was based on U.S. Census poverty thresholds, available at http://www.census.gov/hhes/www/poverty.html.

[¶] Estimates are considered unreliable because the relative standard errors are >20%.

The findings in this report are subject to at least two limitations. First, all health insurance coverage information in NHIS is self-reported and subject to recall bias. Second, because NHIS does not include institutionalized persons, the results are not generalizable to such segments of the population as military personnel or adults in nursing homes and other long-term–care facilities.

Substantial disparities were apparent in uninsured rates for all the demographic and socioeconomic groups ($p<0.001$) during 2004 and 2008. Although no statistically significant increase or decrease in uninsured rates occurred from 2004 to 2008, except the increase in uninsured rates for high school graduates and for the highest income group considered, the increase in uninsured rates for these groups might be the result of the increase in the unemployment rate during the 2008 recession. Coverage expansions resulting from implementation of health-care reform might reduce disparities in uninsured rates. According to the Congressional Budget Office, implementation of health-care reform legislation is expected to increase coverage to approximately 30 million persons who would otherwise have been uninsured in 2019 (*6*).

TABLE 2. Number and percentage of adults aged 18–64 years without health insurance, by poverty status and race/ethnicity — National Health Interview Survey, United States, 2008

	Number	% of total	% without health insurance
Poverty status*			
Poor	8,310,688	27.6	37.0
Near-poor	14,456,984	47.9	30.5
Nonpoor	7,396,055	24.5	8.9
Total	**30,163,727†**	**100.0**	
Race/Ethnicity			
Hispanic	11,600,132	31.5	41.6
White, non-Hispanic	18,145,137	49.2	14.6
Black, non-Hispanic	5,022,521	13.6	22.1
American Indian/Alaska Native	389,820	1.1	33.7
Asian/Pacific Islander	1,229,772	3.3	14.0
Other, non-Hispanic and multiple race	473,113	1.3	20.2
Total	**36,860,495†**	**100.0**	

* Poor = ≤1.0 times the federal poverty level (FPL), near-poor = 1.0–2.9 times FPL, and nonpoor = ≥3.0 times FPL. FPL was based on U.S. Census poverty thresholds, available at http://www.census.gov/hhes/www/poverty.html.

† Totals are different because of unknown poverty status.

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Influenza Vaccination Coverage — United States, 2000–2010

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Vaccines are among the greatest public health achievements of the 20th century (*1*). The majority of *Healthy People 2010* (HP2010) objectives for early childhood vaccination coverage were met by the end of 2010 (*2*), and progress has been made toward eliminating disparities in vaccination coverage among children (*3,4*). Remarkable progress also has been made in improving coverage and reducing disparities in coverage for adolescent vaccinations recommended since 2005 (*5*). Although childhood vaccination programs in the United States have been successful, adolescent programs remain relatively new and adult vaccination programs, although well established, have not achieved acceptable levels of success. Among adults, substantial disparities in vaccination coverage have persisted (*6–10*). A particular challenge for prevention of influenza is the need for annual vaccination. During 1989–1999, national influenza vaccination coverage among persons aged ≥65 years increased each year for all racial/ethnic groups; however, the rate of increase slowed during 1997–2001, and vaccination coverage among non-Hispanic blacks and Hispanics remained lower compared with non-Hispanic whites throughout the entire period (1989–2001) (*11*).

To examine racial/ethnic disparities in influenza vaccination coverage among all persons aged ≥6 months for the 2009–10 influenza season as well as trends in racial/ethnic disparities in influenza vaccination coverage for the 2000–01 through 2009–10 influenza seasons among adults aged ≥65 years, CDC analyzed data from the 2002–2010 Behavioral Risk Factor Surveillance System (BRFSS) questionnaire and the National 2009 H1N1 Flu Survey (NHFS). Racial/ethnic disparities were focused on because these disparities in vaccination coverage have been documented (*11–13*) more extensively compared with other disparity domains (e.g., sex, income, education, and disability status). State-level estimates have been published previously (*14,15*) and are not included in this report. Additional information is available at http://www.cdc.gov/flu/professionals/vaccination/vaccinecoverage.htm.

BRFSS is a state-based telephone survey collecting information from approximately 400,000 randomly selected persons aged ≥18 years among the noninstitutionalized, U.S. civilian population. NHFS was a national random-digit–dialed telephone survey conducted in all 50 states and the District of Columbia (DC) during October 2009–June 2010 to track both influenza A (H1N1) 2009 monovalent vaccination (H1N1 influenza vaccination) and seasonal influenza vaccination coverage (*14,15*). In the 2009–10 influenza season, BRFSS respondents were asked if they (or their children, in 43 states and DC) had been vaccinated for the "seasonal flu" in the past 12 months or if they (in 49 states and DC, or their children in 46 states and DC) had been vaccinated for "H1N1 flu" since September 2009, and if so, in which month. NHFS respondents aged ≥18 years were asked whether they (or their children) had received "seasonal flu vaccination" since August 2009 or "H1N1 flu" vaccination since September 2009 and if so, in which month. The Council of American Survey and Research Organizations (CASRO) response rates* for NHFS were 34.0% for landline and 25.5% for cellular telephones; cooperation rates were 45% and 57%, respectively. The median state CASRO response and cooperation rates for BRFSS were 54% and 76%, respectively.

CDC used the Kaplan-Meier survival analysis method to estimate the cumulative proportion of persons with ≥1 dose of combined seasonal or H1N1 influenza vaccination and seasonal (only) influenza vaccination during August 2009–May 2010 from BRFSS and NHFS monthly data. To improve precision for groups within states, particularly for children, CDC combined the estimates from BRFSS and NHFS. For respondents with missing information on month and year of vaccination, this information was imputed based on donor pools matched for week of interview, age group, state of residence and race/ethnicity. Racial/ethnic differences in combined seasonal or H1N1 influenza vaccination and seasonal (only) influenza vaccination coverage for the 2009–10 season were examined by using Student's t-tests for all persons aged ≥6 months, children aged 6 months–17 years, adults aged 18–49 years with high-risk† conditions, adults aged 50–64 years, and adults aged ≥65 years. All tests were two-tailed with an alpha level of 0.05. For adults aged ≥65 years, CDC examined trends in racial/ethnic disparities in influenza vaccination coverage over the previous decade by using 1) 2001–2009 BRFSS survey data collected during March–August each year (representing seasonal [only] influenza vaccinations received for the 2000–01 through 2008–09 influenza seasons) and 2) BRFSS and NHFS data collected during October 2009–June 2010 (representing influenza vaccinations received for the 2009–10 influenza season). Kaplan-Meier survival analysis was used to estimate coverage for the 2009–10 season. Point estimates

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* The response rate is the number of complete interviews divided by the number of eligible persons in the sample. The cooperation rate is the proportion of all persons interviewed among all eligible persons ever contacted.

† High-risk conditions include asthma, other lung problems, diabetes, heart disease, kidney problems, anemia, weakened immune system caused by a chronic illness or by medicines taken for a chronic illness.

and 95% confidence intervals (CIs) for each year were calculated for each racial/ethnic group (i.e., non-Hispanic whites, non-Hispanic blacks, Hispanics, and non-Hispanic other[§] persons). In keeping with convention, non-Hispanic whites were chosen as the referent group because this is the largest racial/ethnic group in the United States, and this population has had historically higher coverage estimates. All analyses were conducted by using statistical software that account for the complex survey design, and results from both surveys were weighted to reflect the U.S. resident, civilian, noninstitutionalized population.

The estimated national combined seasonal or H1N1 influenza vaccination coverage levels for the 2009–10 influenza season among all persons aged ≥6months, children aged 6 months–17 years, adults aged 18–49 years with high-risk conditions, adults aged 50–64 years, and adults aged ≥65 years were 48.8%, 55.2%, 45.3%, 48.7%, and 72.0% respectively. Among all persons aged ≥6 months, combined seasonal or H1N1 influenza vaccination coverage was higher among non-Hispanic whites (49.5%) compared with non-Hispanic blacks (40.5%) and Hispanics (43.5%) (p<0.05 for both) (Table). For children aged 6 months–17 years, combined coverage was lower among blacks (49.4%) compared with whites (53.8%), and higher among Hispanics (61.2%) and other non-Hispanic persons (63.5%) compared with whites (p<0.05 for both). Among adults aged 18–49 years with high-risk conditions, no statistically significant differences by race/ethnicity were observed for combined seasonal or H1N1 influenza vaccination. For adults aged 50–64 years, non-Hispanic blacks (44.5%) and Hispanics (46.2%) had significantly lower combined seasonal or H1N1 influenza vaccination coverage, compared with non-Hispanic whites (49.8%). Similarly, for adults aged ≥65 years, non-Hispanic blacks (58.3%) and Hispanics (61.4%) had significantly lower combined seasonal or H1N1 influenza vaccination coverage compared with non-Hispanic whites (73.9) (p<0.05 for each). Racial/ethnic differences in seasonal (only) influenza vaccination coverage were similar to combined seasonal or H1N1 influenza vaccination coverage estimates except among adults aged 18–49 years with high-risk conditions, for whom seasonal (only) influenza vaccination coverage was higher among non-Hispanic whites (39.9%) than among non-Hispanic blacks (34.8%) (Table).

Among adults aged ≥65 years, racial/ethnic differences in influenza vaccination coverage persisted from 2000 through 2010, with non-Hispanic blacks consistently having the lowest coverage each year (Figure). The yearly gap in influenza vaccination coverage between non-Hispanic blacks and non-Hispanic whites from the 2000–01 to the 2009–10 season ranged from a difference of 15 to a difference of 23 percentage points. The gap between Hispanics and non-Hispanic whites ranged from 7 to 16 percentage points.

[§] Respondents who self-identified as Asian, American Indian/Alaska Native, Native Hawaiian, Pacific Islander, and persons of multiple races were classified in the "Other" group because of the small sample size.

TABLE. Influenza vaccination coverage,[*] by race/ethnicity[†] — Behavioral Risk Factor Surveillance System and National 2009 H1N1 Flu Survey, United States, 2009–2010.

	Children aged 6 mos–17 yrs (n = 159,652)		Adults at high-risk[§] aged 18–49 yrs (n = 21,821)		Adults aged 50–64 yrs (n = 117,267)		Adults aged ≥65 yrs (n = 112,752)		All aged ≥6 mos (n = 514,785)	
	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
Combined seasonal or influenza A (H1N1) 2009 monovalent vaccination coverage										
All	**55.2**	**(54.4–56.0)**	**45.3**	**(43.7–46.9)**	**48.7**	**(48.1–49.3)**	**72.0**	**(71.6–72.5)**	**47.8**	**(47.4–48.2)**
White, non-Hispanic	53.8	(52.9–54.7)	46.0	(44.3–47.7)	49.8	(49.2–50.4)	73.9	(73.4–74.4)	**49.5**	**(49.1–49.9)**
Black, non-Hispanic	49.4[¶]	(46.9–51.9)	42.0	(38.4–45.6)	44.5[¶]	(42.4–46.6)	58.3[¶]	(56.0–60.6)	**40. 5[¶]**	**(39.3–41.7)**
Hispanic	61.2[¶]	(59.1–63.3)	43.6	(39.5–47.7)	46.2[¶]	(43.4–49.0)	61.4[¶]	(58.1–64.7	**43. 5[¶]**	**(42.2–44.8)**
Other, non-Hispanic**	63.5[¶]	(60.6–66.4)	45.0	(39.0–51.0)	47.8	(44.7–50.9)	71.8	(68.7–74.9)	**49.9**	**(48.3–51.5)**
Seasonal (only) influenza vaccination coverage										
All	**43.7**	**(42.8–44.6)**	**38.2**	**(36.9–39.5)**	**45.0**	**(44.4–45.6)**	**69.6**	**(69.0–70.2)**	**41.2**	**(40.8–41.6)**
White, non-Hispanic	43.2	(42.3–44.1)	39.9	(38.3–41.5)	46.5	(45.9–47.1)	71.7	(71.2–72.2)	**43.9**	**(43.5–44.3)**
Black, non-Hispanic	37.0[¶]	(34.4–39.6)	34.8[¶]	(31.5–38.1)	40.3[¶]	(38.3–42.3)	55.2[¶]	(52.9–57.5)	**33.7[¶]**	**(32.5–34.9)**
Hispanic	46.9[¶]	(44.3–49.5)	35.5	(31.6–39.4)	40.6[¶]	(37.9–43.3)	56.1[¶]	(52.8–59.4)	**33.6[¶]**	**(32.4–34.8)**
Other, non-Hispanic*	53.6[¶]	(50.5–56.7)	41.3	(35.5–47.1)	44.1	(40.6–47.6)	68.1	(64.9–71.3)	**42.4**	**(40.8–44.0)**

Abbreviation: CI = confidence interval.

[*] Coverage estimates are for persons with reported vaccination during August 2009–May 2010 who were interviewed during October 2009–June 2010.

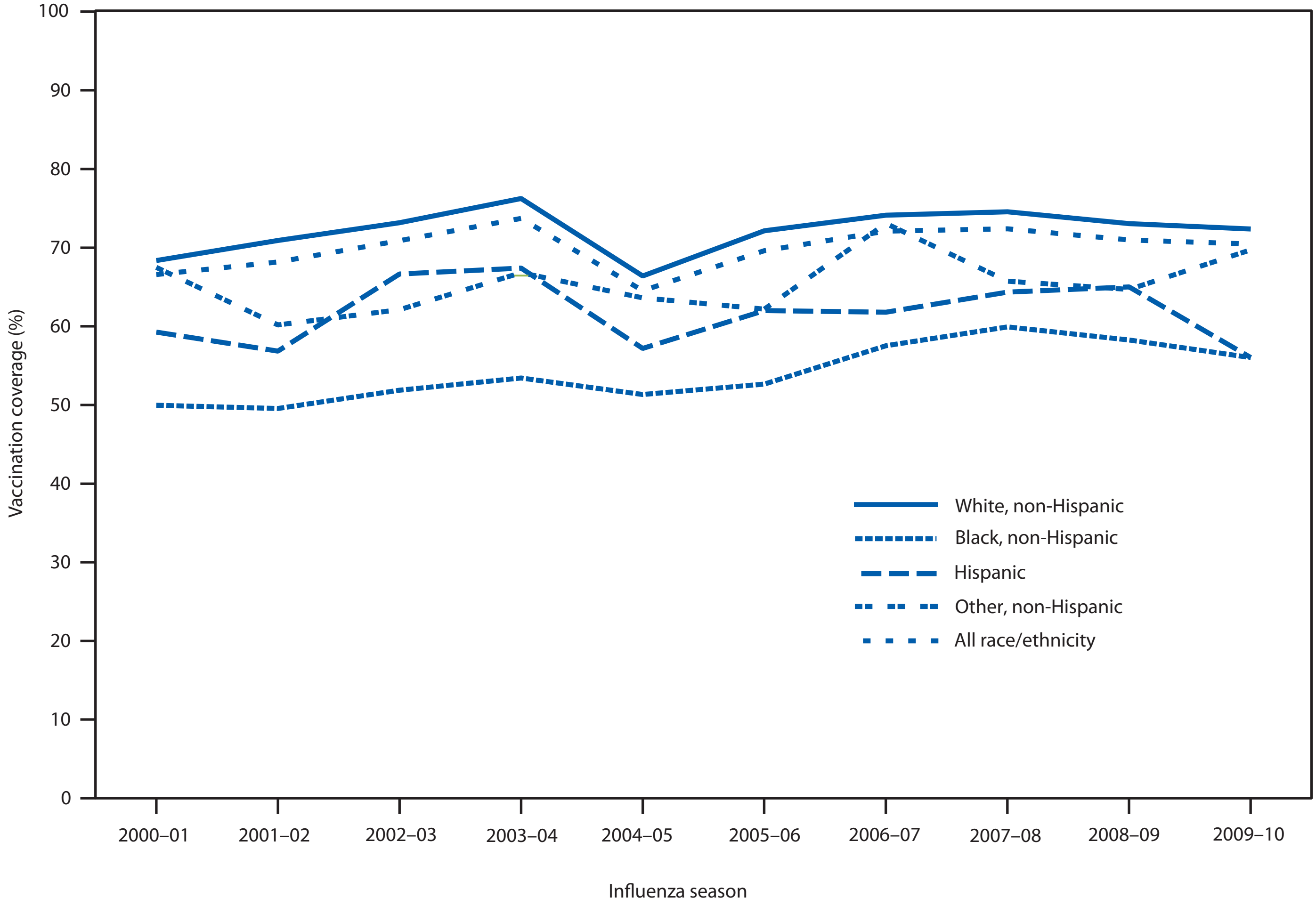
[†] Race/ethnicity categories are mutually exclusive.

[§] High-risk conditions include asthma, other lung problems, diabetes, heart disease, kidney problems, anemia, and weakened immune system caused by a chronic illness or by medicines taken for a chronic illness.

[¶] Statistically significant difference at p<0.05 (t-test) in estimated vaccination coverage. Referent group was non-Hispanic whites.

[**] Because of limited sample sizes, respondents who self-identified as Asians, American Indians/Alaska Natives, Native Hawaiians, Pacific Islanders, and persons of multiple races were classified in the non-Hispanic Other group.

FIGURE. Influenza vaccination coverage for adults aged ≥65 years, by race/ethnicity —Behavioral Risk Factor Surveillance System (BRFSS), United States, 2000–2010*



* For the 2000–01 through 2008–09 seasons, BRFSS survey data collected during March–August each year were used to estimate point estimates of coverage for adults aged ≥65 years. For the 2009–10 season time point, Kaplan-Meier survival analysis was used to estimate coverage among adults aged ≥65 years by using BRFSS and National 2009 H1N1 Flu Survey data collected during October 2009 – June 2010. The 2009–10 time point estimates do not include influenza A (H1N1) 2009 monovalent vaccinations.

The gap between non-Hispanic whites and other non-Hispanic persons ranged from <1 to 11 percentage points.

These findings are subject to at least three limitations. First, both BRFSS and NHFS are telephone-based surveys and do not include households without telephone service; in addition, BRFSS estimates did not include households with only cellular telephone service; such households are more likely to have younger occupants, minorities, and renters (*16*) whose vaccination levels might be lower than those among persons living in other households. For these reasons, the findings presented in this report might not be generalizable to the entire U.S. population. Second, response rates for both surveys were low, and nonresponse bias can remain even after weighting adjustments to reflect the national population subgroup distribution and nonresponse. Finally, self-reported vaccination status was not validated from medical records and is subject to recall bias.

For the 2009–10 influenza season, lower influenza vaccination coverage was observed for non-Hispanic blacks compared with non-Hispanic whites, among children aged 6 months–17 years, adults aged 50–64 years, and adults aged ≥65 years. Compared with the successes achieved in childhood vaccinations, among adults aged ≥65 years, substantial racial/ethnic disparities in influenza vaccination have persisted, and coverage remains well below the HP2010 target of 90%. This target hs been retained for HP2020 (*17*). Reasons for disparities in vaccination coverage are multifactorial (*11,18–23*). The Advisory Committee on Immunization Practices now recommends influenza vaccination for all persons in the United States aged ≥6 months (*24*) making monitoring of disparities in influenza vaccinations among all age groups essential. With implementation of the Vaccines for Children program, disparities among childhood vaccinations have been reduced substantially (*25*). To eliminate disparities in adult influenza vaccination, evidence-based interventions are needed, including the use of reminder/recall systems, standing orders for vaccination, regular assessments of vaccination coverage levels among provider practices, vaccination registries, improving public and provider awareness of the importance of vaccinations for adults, and public financing of recommended vaccines (*26,27*).

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Colorectal Cancer Screening — United States, 2002, 2004, 2006, and 2008

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Of the types of cancer that affect both men and women, colorectal cancer is the second leading cause of cancer-related deaths in the United States (*1*). Screening reduces colorectal cancer incidence and mortality (*2*). The U.S. Preventive Services Task Force recommended in 2008 that persons aged 50–75 years at average risk for colorectal cancer be screened for the disease by using one or more of the following methods: fecal occult blood testing (FOBT) every year, sigmoidoscopy every 5 years (with high-sensitivity FOBT every 3 years), or colonoscopy every 10 years (*1*).

To estimate disparities in rates of use of colorectal cancer tests and evaluate changes in test use, CDC compared data from the 2002, 2004, 2006, and 2008 Behavioral Risk Factor Surveillance System (BRFSS) surveys (*3*). BRFSS is a state-based, random-digit–dialed telephone survey of the noninstitutionalized, U.S. civilian population aged ≥18 years. Survey data were available for all 50 states (except for Hawaii in 2004) and the District of Columbia. The median response rate, based on Council of American Survey and Research Organizations (CASRO) guidelines,* was 58.3% in 2002, 52.7% in 2004, 51.4% in 2006, and 53.3% in 2008 (*3*). The median cooperation rate, based on CASRO guidelines, was 76.7% in 2002, 74.3% in 2004, 74.5% in 2006, and 75.0% in 2008 (*3*). Respondents who refused to answer, had a missing answer, or did not know the answer to a question were excluded from analysis of that specific question. Of persons aged ≥50 years who responded, approximately 3% of 108,028 persons were excluded from 2002 results, approximately 3% of 146,794 were excluded from 2004 results, approximately 4.5% of 195,318 were excluded from 2006 results, and approximately 4.1% of 251,623 were excluded from 2008 results.

Survey questions and response options were identical for survey years 2002, 2004, and 2006. Respondents aged ≥50 years were asked if they had ever used a “special kit at home to determine whether the stool contains blood (FOBT),” whether they had ever had “a tube inserted into the rectum to view the colon for signs of cancer or other health problems (sigmoidoscopy or colonoscopy),” and when these tests were last performed. In 2008, respondents also were asked whether their most recent test had been a sigmoidoscopy or a colonoscopy. For this report, as in previous reports (*4*–*6*), sigmoidoscopy and colonoscopy rates are measured and reported as a combined measure and described as lower endoscopy. Percentages were estimated for persons aged ≥50 years who reported receiving an FOBT within 1 year preceding the survey or lower endoscopy within 10 years preceding the survey, the recommended interval for colonoscopy for persons at average risk. For this analysis, all persons aged ≥50 years were included based on consideration of the screening recommendations during survey years and other age-related influences on screening (e.g., Medicare benefits for persons aged ≥65 years). States were categorized into poverty quartiles by using data from the 2009 Current Population Survey (available at http://cps.ipums.org/cps/sda), and aggregate screening rates per quartile were calculated. Respondents were defined as having a disability if they responded yes when asked whether they were limited in any way in any activities because of physical, mental, or emotional problems. Aggregate percentages and 95% confidence intervals were calculated by selected characteristics. Data were weighted according to the sex, racial/ethnic, and age distribution of the adult population of each state by using intercensal estimates and were age standardized to the 2008 BRFSS population aged ≥50 years. The Wald F test was used to determine the significance of differences among the four surveys.

In 2008, a total of 64.2% of respondents aged ≥50 years reported having had an FOBT within 1 year preceding the survey or lower endoscopy within 10 years preceding the survey, compared with 60.7% in 2006, 56.7% in 2004, and 53.8% in 2002 (Table 1). For all survey years, the proportions of persons aged ≥50 years who reported having had either test within recommended intervals was greater among persons aged ≥65 years than among those aged 50–64 years. The proportion was greater for non-Hispanic whites compared with all other races; men compared with women, persons with a disability compared with those with no disability, and persons with health insurance compared with those with no health insurance. The difference in proportions also increased with time among those with health insurance, compared with those with no health insurance (55.8% versus 33.0% in 2002, respectively, and 66.6% versus 37.5%, respectively, in 2008). Reported rates of test use increased with increasing education level and increasing household income. By composite state quartiles, reported screening rates decreased with increasing levels of poverty (Table 2).

The findings in this analysis indicate that although overall use of colorectal cancer tests increased from 2002 to 2008, disparities exist in the prevalence of colorectal cancer test use among certain groups. Although colorectal cancer test use increased among racial/ethnic minorities, those without health insurance, those with lower

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* Available at http://www.cdc.gov/brfss/technical_infodata/quality.htm. The response rate is the percentage of persons who completed interviews among all eligible persons, including those who were not successfully contacted. The cooperation rate is the percentage of persons who completed interviews among all eligible persons who were contacted.

TABLE 1. Percentage of respondents aged ≥50 years who reported receiving a fecal occult blood test within 1 year or a lower endoscopy* within 10 years, by selected characteristics — Behavioral Risk Factor Surveillance System, United States, 2002, 2004, 2006, and 2008†

	2002		2004		2006		2008	
Characteristic	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
Age (yrs)								
50–64	47.9	(47.1–48.6)	50.3	(49.6–51.0)	54.8	(54.1–55.4)	58.2	(57.6–58.7)
≥65	62.2	(61.4–63.0)	65.8	(65.1–66.5)	69.2	(68.6–69.8)	72.8	(72.3–73.3)
Sex								
Male	55.1	(54.2–55.9)	57.9	(57.1–58.7)	61.4	(60.7–62.1)	65.1	(64.5–65.6)
Female	52.9	(52.2–53.6)	55.8	(55.2–56.4)	60.3	(59.7–60.8)	63.6	(63.1–64.0)
Race/Ethnicity								
White, non-Hispanic	55.3	(54.8-55.8)	58.2	(57.7-58.7)	62.5	(62.0-62.9)	66.2	(65.9-66.5)
Black, non-Hispanic	51.8	(49.6-54.0)	55.3	(53.3-57.2)	58.9	(57.2-60.6)	62.9	(61.5-64.3)
Asian/Pacific Islander	50.9	(37.8-63.9)	39.6	(27.8-52.7)	57.0	(45.2-68.0)	62.9	(52.3-72.3)
American Indian/Alaska Native	54.1	(47.8-60.3)	45.2	(40.2-50.4)	50.5	(45.5-55.5)	57.8	(54.1-61.5)
Other, non-Hispanic	50.4	(46.4-54.3)	56.0	(52.3-59.7)	58.0	(54.5-61.4)	57.9	(55.1-60.7)
Hispanic	43.8	(40.4-47.1)	46.0	(43.0-49.0)	47.1	(44.4-49.8)	51.2	(49.2-53.3)
Education level								
Less than high school	40.8	(39.1–42.5)	43.8	(42.0–45.6)	45.3	(43.6–47.0)	48.6	(47.1–50.0)
High school graduate or GED	50.5	(49.6–51.4)	52.7	(51.9–53.6)	56.5	(55.7–57.2)	59.7	(59.1–60.4)
Some college or technical school	56.3	(55.3–57.3)	58.3	(57.3–59.3)	62.5	(61.6–63.3)	65.3	(64.6–66.0)
College graduate	61.9	(60.9–62.9)	64.7	(63.8–65.5)	68.6	(67.8–69.3)	72.1	(71.5–72.6)
Annual household income ($)								
<15,000	43.2	(41.4–45.1)	44.9	(43.2–46.6)	48.3	(46.6–50.0)	49.4	(48.1–50.8)
15,000–34,999	48.9	(47.9–49.9)	51.0	(50.0–52.0)	53.7	(52.7–54.7)	56.6	(55.8–57.4)
35,000–49,999	55.9	(54.5–57.2)	58.5	(57.3–59.7)	61.8	(60.6–62.9)	64.2	(63.2–65.1)
50,000–74,999	59.2	(57.2–61.1)	61.9	(60.5–63.3)	67.0	(65.9–68.1)	68.8	(67.9–69.7)
≥75,000	64.7	(63.1–66.3)	67.9	(66.6–69.1)	70.2	(69.2–71.2)	74.8	(74.1–75.4)
Disability								
Yes	57.5	(55.5–59.4)	59.5	(58.5–60.4)	62.7	(61.8–63.5)	66.3	(65.7–67.0)
No	52.2	(51.0–53.4)	55.8	(55.2–56.4)	59.9	(59.4–60.4)	63.3	(62.8–63.7)
Health insurance								
Yes	55.8	(55.2–56.3)	58.8	(58.2–59.3)	62.9	(62.4–63.3)	66.6	(66.2–66.9)
No	33.0	(30.6–35.3)	34.5	(32.1–37.0)	36.5	(34.1–38.9)	37.5	(35.4–39.5)
Total§	**53.8**	**(53.2–54.3)**	**56.7**	**(56.2–57.2)**	**60.7**	**(60.2–61.1)**	**64.2**	**(63.8–64.5)**

Abbreviations: CI = confidence interval; GED = general equivalency diploma.

* Sigmoidoscopy or colonoscopy.

† Age-standardized to the 2008 Behavioral Risk Factor Surveillance System population aged ≥50 years.

§ Wald F test of significance for differences across the survey years, p<0.001.

household incomes (<$35,000 annually), and those with less than a high school education, these four groups had a substantially lower prevalence of test use than did the comparison groups surveyed. However, the difference between the white and black populations was substantially less than the difference between whites and other racial/ethnic populations. Although rates of use of colorectal cancer tests increased among both those with and those without disabilities, rates were lower among persons without disabilities than among those with disabilities. Decreasing family income was associated with decreasing colorectal cancer screening rate.

Although colorectal cancer test use increased by approximately 11 percentage points among white and black populations from 2002 to 2008, only an approximate 4 percentage point increase in test use occurred among American Indian/Alaska Native populations. Those without health insurance had a 4.5 percentage point increase, compared with a 10.8 percentage point increase in screening rates among those with insurance. These differences might indicate that interventions are disproportionally reaching populations or have varying effects among different groups, an area in which additional research is needed (*7*). Factors that also might contribute to disparities in colorectal cancer test use include lack of awareness of the need for screening, lack of recommendation for screening from a physician, lack of health insurance, and lack of a usual source of care, all factors that can be more pronounced among underserved populations (*6,8,9*).

Previous studies have documented a greater prevalence of colorectal cancer test use among men compared with women (*6,8*). Available data indicate that the difference in use between men and women decreased during 2002–2006 but increased during 2006–2008. Respondents aged ≥65 years had a greater prevalence of colorectal cancer test use, compared with those aged 50–64 years, which might be associated with the availability of Medicare coverage

TABLE 2. Colorectal cancer screening rates, by state poverty-level quartile — Behavioral Risk Factor Surveillance System, United States, 2008

State/Area	Population in poverty (%)	Fecal occult blood test within 1 year or lower endoscopy* during preceding 10 years %	(95% CI)
Quartile 1			
New Hampshire	7.1	73.3	(71.7–74.9)
Utah	7.8	66.3	(64.0–68.5)
Connecticut	8.2	70.6	(68.7–72.5)
Alaska	8.3	57.8	(53.6–61.8)
Maryland	8.9	72.2	(70.6–74.7)
Vermont	9.2	71.0	(69.5–72.5)
New Jersey	9.3	61.9	(60.3–63.5)
Delaware	9.7	74.3	(71.9–76.5)
Iowa	9.7	64.5	(62.7–66.3)
Minnesota	9.9	70.1	(68.1–71.9)
Wisconsin	9.9	67.0	(64.8–69.1)
Hawaii	10.1	62.7	(60.6–64.7)
Wyoming	10.2	57.7	(56.3–59.2)
Composite†	**—**	**67.2**	**(66.6–67.9)**
Quartile 2			
Virginia	10.5	71.3	(69.2–73.4)
Washington	10.6	67.8	(66.9–68.8)
Nebraska	10.7	60.1	(58.5–61.6)
Oregon	10.8	66.8	(64.9–68.6)
Nevada	10.9	55.4	(52.5–58.3)
Pennsylvania	11.1	63.6	(62.0–65.2)
Colorado	11.2	64.7	(63.4–66.0)
Massachusetts	11.3	73.6	(72.4–74.8)
North Dakota	12	59.2	(57.4–61.1)
Maine	12.1	74.5	(73.0–76.0)
Idaho	12.4	56.7	(54.7–58.7)
Illinois	12.4	59.8	(57.6–61.8)
Rhode Island	12.9	71.8	(69.9–73.6)
Composite	**—**	**65.3**	**(64.6–65.9)**
Quartile 3			
Kansas	13	63.2	(61.8–64.6)
Michigan	13.1	68.5	(67.0–69.9)
Montana	13.2	58.8	(57.0–60.5)
Florida	13.3	66.0	(64.0–68.0)
South Dakota	13.4	63.2	(61.4–64.9)
Missouri	13.5	61.8	(59.5–63.9)
Ohio	13.8	61.9	(60.6–63.3)
Oklahoma	13.8	55.2	(53.5–56.8)
North Carolina	14.1	68.0	(66.7–69.2)
South Carolina	14.1	66.1	(64.3–67.9)
New York	14.3	67.3	(65.6–69.1)
Alabama	14.4	61.1	(59.1–63.0)
Indiana	14.4	60.0	(57.7–62.2)
Composite	**—**	**64.8**	**(64.2–65.4)**
Quartile 4			
West Virginia	14.6	56.6	(54.5–58.7)
California	14.7	63.1	(61.5–64.6)
Tennessee	15.3	62.1	(59.9–64.3)
Arkansas	15.4	55.8	(53.8–57.7)
Georgia	15.6	65.6	(63.5–67.5)
Texas	15.9	58.3	(56.6–60.1)
District of Columbia	16.8	69.8	(67.4–72.0)
Kentucky	17.2	63.9	(62.1–65.6)
Arizona	18.1	64.1	(61.0–67.0)
Mississippi	18.3	57.9	(56.2–59.5)
Louisiana	18.4	56.6	(54.6–58.4)
New Mexico	19.3	57.8	(55.8–59.7)
Composite	**—**	**61.4**	**(60.6–62.1)**

Abbreviation: CI = confidence interval.

* Sigmoidoscopy or colonoscopy.

[†] Composite screening percentage: the weighted number of persons who received a test divided by the estimated population total of all the states within the quartile of interest.

for colorectal cancer screening after age 65 years (*6,8*). Variations in prevalence of test use by state might result from variations in demographic characteristics, insurance coverage, and availability of providers to perform endoscopy (*10,11*). Additional contributing factors might be increased public awareness of the importance of screening (*8*) and adoption of the Healthcare Effectiveness Data and Information Set (HEDIS) measure in 2004 that encourages health plans to cover colorectal screening tests (*12*). Furthermore, multiple state and federal initiatives have focused on increasing colorectal cancer test use, including the following: a statewide colorectal cancer screening program in Maryland supported through tobacco restitution funds; a statewide endoscopy screening program in Colorado funded by the state tobacco tax; the Colorectal Cancer Screening and Prostate Initiative Program in the state of New York, which has provided colorectal cancer screening to uninsured or underinsured residents since 2001; the CDC-funded Colorectal Cancer Screening Demonstration Program (CRCSDP), which supported state and local screening programs during 2005–2009; and the new CDC Colorectal Cancer Control Program (CRCCP), which provides funds to 25 states and four tribal organizations to increase population-level screening rates (*13,14*).

The CDC colorectal cancer screening programs were established specifically to address disparities in colorectal cancer screening rates and to improve access to underserved populations. The CDC CRCSDP provided services for low-income men and women aged ≥50 years with inadequate or no colorectal cancer screening insurance coverage at five sites across the country, including Baltimore, Maryland; St. Louis, Missouri; Nebraska (statewide); Suffolk

County, New York; and Clallam, Jefferson, and King counties in Washington (*13*). Two of the programs focused on racial minorities (blacks in St. Louis; American Indians/Alaska Natives and blacks in the state of Washington).

On the basis of the success of implementing and sustaining CRCSDP, CDC received funds to establish CRCCP in 2009, with a goal of increasing screening rates among those aged ≥50 years to 80% in each of the participating states and tribal nations by 2014 (*14*). The majority of program funds are dedicated to screening promotion, with CRCCP programs using evidence-based strategies recommended by the Task Force on Community Preventive Services (http://www.thecommunityguide.org) to increase population-level screening, with a limited proportion of funds used to provide screening and follow-up care to low-income men and women aged 50–64 years who are underinsured or uninsured for screening (*14*). When possible, screening services of this program are integrated with other publicly funded health programs (e.g., the CDC National Breast and Cervical Early Detection Program [available at http://www.cdc.gov/cancer/nbccedp], the CDC WISEWOMAN Program [available http://www.cdc.gov/wisewoman], and the federally funded health centers of the Health Resources and Service Administration [available at http://bphc.hrsa.gov]).

CDC also provides funds to programs that are part of the National Comprehensive Cancer Control Program. Sixty-nine programs, which include all 50 U.S. states, the District of Columbia, seven tribes, and seven territories, are funded, all of which address non-service delivery components of colorectal cancer control in their state, tribal, and territorial cancer control plans (*15*).

The findings in this report are subject to at least four limitations. First, the results might underestimate or overestimate actual colorectal cancer screening test rates because BRFSS does not determine the indication for the test (screening versus diagnostic use) and does not determine whether the tests were conducted according to the U.S. Preventive Services Task Force's recommended timeline, particularly with regards to the combined lower endoscopy measure. Second, BRFSS excludes certain populations, including persons in institutions and persons without landline telephones. Certain populations are more likely to be represented in households without landline telephones (e.g., younger, Hispanic, and lower-income adults) (*16*). Therefore, the results might not be generalizable to the entire U.S. adult population. Third, responses are self-reports and not validated by medical record review. Finally, participation rates for random-digit–dialed health surveys have been decreasing. However, although BRFSS has a low median response rate, the BRFSS weighting procedure partially corrects for nonresponse.

As with cancer screening rates, disparities are evident in cancer incidence. Although colorectal cancer incidence is decreasing in the United States among the total population, incidence rates are higher among blacks and lower among American Indians/Alaska Natives than among other racial/ethnic populations (*17,18*). Coordinated efforts by CDC and other federal agencies, state and local health departments, and the medical community to address barriers to and disparities in screening should be continued so that the incidence of and comorbidities associated with colorectal cancer can be reduced among all populations.

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Health Outcomes

Mortality

Infant Deaths — United States, 2000–2007

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Infant mortality rates are an important indicator of the health of a nation because they are associated with maternal health, quality of and access to medical care, socioeconomic conditions, and public health practices (*1*,*2*). The U.S. infant mortality rate (the number of deaths among infants aged <1 year per 1,000 live births) declined from approximately 100 deaths per 1,000 births in 1900 (*3*) to 6.89 in 2000 (*4*). However, the rate did not decline substantially from 2000 to 2005. The infant mortality rate declined slightly but significantly from 6.86 in 2005 to 6.68 in 2006. The 2007 rate (6.75) was not significantly different from the 2006 rate (6.68) (*4–6*). In addition, considerable differences in infant mortality rates among racial/ethnic groups have persisted and even increased, demonstrating that not all racial/ethnic groups have benefited equally from social and medical advances (*5,7*).

To analyze trends and variations in infant mortality in the United States, CDC analyzed data from linked birth–infant death data sets (linked files) for 2000–2006 (*8*). In these data sets, information from the birth certificate is linked to information from the death certificate for each infant (aged <1 year) who dies in the United States. This allows researchers to use the more accurate race/ethnicity data from the birth certificate for infant mortality analysis (*8,9*). Linked data are available through 2006. Data by maternal race and Hispanic ethnicity are based on information reported by the mother during the birth registration process. Race and ethnicity are reported separately on birth certificates, and persons of Hispanic origin might be of any race. Data from the main mortality file (i.e., death certificates not linked to birth certificates) are available for 2007 and are used for the overall infant mortality rate but not for race/ethnicity comparisons (*6*). Infant mortality rates were calculated as the number of infant deaths per 1,000 live births in the specified group. Percentage change over time was calculated by comparing the rates for the beginning and end points in each period. Differences between infant mortality rates were assessed for statistical significance by using the z test ($p<0.05$). National data on infant mortality according to educational attainment and family income status were not analyzed; these data are not available because they are either not collected or collected inconsistently.

During 2007, a total of 29,138 infant deaths occurred in the United States, with a U.S. infant mortality rate of 6.75 deaths per 1,000 live births (*6*), compared with 6.89 during 2000 (*5*). The infant mortality rate in the United States was higher than the rate for the majority of other developed countries, in part because of a substantially higher percentage of preterm births, a critical risk factor for infant mortality (*10*).

During 2006, the latest year for which reliable race/ethnicity data are available, the overall U.S. infant mortality rate was 6.68 infant deaths per 1,000 live births, with considerable disparities by race and Hispanic origin (Table). The highest infant mortality rate was for non-Hispanic black women (13.35), with a rate 2.4 times that for non-Hispanic white women (5.58). Compared with non-Hispanic white women (5.58), infant mortality rates were 48% higher for American Indian/Alaska Native (AI/AN) women (8.28) and 44% higher for Puerto Rican women (8.01). Compared with non-Hispanic white women (5.58), infant mortality rates were 4% lower for Mexican (5.34) women and 18% and 19% lower for Asian/Pacific Islander (A/PI) (4.55) and Central or South American women (4.52), respectively. Cuban mothers also had a low rate (5.08). Percentage changes from 2000 to 2006 in infant mortality rates for each racial/ethnic group were not statistically significant.

Racial/ethnic differences in infant mortality rates might reflect, in part, differences in maternal sociodemographic and behavioral risk factors. For example, infant mortality rates are higher than the U.S. average among infants born to mothers who are adolescents, unmarried, smokers, have lower educational levels, had a fourth or higher order birth, or did not obtain adequate prenatal care (*5*). Substantial racial/ethnic disparities in income and access to health care also might contribute to differences in infant mortality (*11*). Racial/ethnic groups with the lowest infant mortality rates tend to have a smaller percentage of births to women with some or all of these characteristics, whereas the racial/ethnic groups with the highest infant mortality rates tend to have a higher percentage of births to women with some or all of these characteristics. However, the influence of an individual risk factor can vary considerably by race/ethnicity, indicating different medical profiles and life experiences for women of different racial/ethnic groups (*7,12*). For example, because of worsening health profiles, advancing maternal age might have more of an effect on infants born to black women than to white women (*12*). Conversely, reports indicate that supportive cultural and family environments among Mexican women contribute to low infant mortality rates, despite lower income and health insurance levels and a higher prevalence of certain risk factors (*5,13,14*). Other factors frequently mentioned as contributing to racial/ethnic differences in infant mortality include differences in maternal preconception health, infection, stress, racism, and social and cultural differences (*7,12,15–17*).

Risk factors associated with infant mortality rates are also risk factors for preterm or low birth-weight delivery and can affect infant mortality either directly or through the mechanism of preterm or low birth-weight delivery. In 2006, the percentage of infants born preterm (<37 completed weeks' gestation) was substantially higher for non-Hispanic black (18.5%), Puerto Rican (14.4%), and AI/AN (14.2%) mothers than for non-Hispanic white mothers (11.7%)

TABLE. Infant mortality rates, by maternal race and Hispanic ethnicity — linked birth–infant death data sets, United States, 2000 and 2006

	2000		2006		
Maternal race/ethnicity	Infant mortality rate*	Difference compared with non-Hispanic white mothers (%)	Infant mortality rate	Difference compared with non-Hispanic white mothers (%)	Change in infant mortality rate from 2000 to 2006 (%)
American Indian/Alaska Native†	8.30	45.6§	8.28	48.4§	–0.2
Asian/Pacific Islander†	4.87	–14.6§	4.55	–18.5§	–6.6
Black, non-Hispanic	13.59	138.4§	13.35	139.2§	–1.8
White, non-Hispanic	5.70	Ref.	5.58	Ref.	–2.1
Hispanic, total¶	5.59	–1.9	5.41	–3.0	–3.2
Central or South American	4.64	–18.6§	4.52	–19.0§	–2.6
Cuban	4.54	–20.4	5.08	–9.0	11.9
Mexican	5.43	–4.7§	5.34	–4.3§	–1.7
Puerto Rican	8.21	44.0§	8.01	43.5§	–2.4
Total	**6.89**	—**	**6.68**	—	**–3.0§**

Source: Period linked birth-infant death public-use data files [Downloadable data files]. Hyattsville, MD: US Department of Health and Human Services, CDC, National Center for Health Statistics; 2010. Available at http://www.cdc.gov/nchs/data_access/VitalStatsOnline.htm.

* Number of deaths among infants aged <1 year per 1,000 live births.

† Includes persons of Hispanic and non-Hispanic origin.

§ Significant difference (p<0.05) by Z test.

¶ Includes other categories of Hispanic origin and Hispanics whose specific category is unknown.

** Category not applicable.

(*13*). Infant mortality rates are substantially higher for preterm and low birth-weight infants, and even limited changes in the percentages of preterm or low birth-weight births can have a major impact on infant mortality rates (*5*).

The findings in this report are subject to at least two limitations. First, because of small numbers for AI/ANs, A/PIs, and Cubans, which might cause wide fluctuations in rates, trends and differences in infant mortality rates for these populations should be interpreted with caution. Second, not all infant deaths in the linked birth/infant death file used in this analysis are linked to their corresponding birth certificate. In 2006, 1.3% of infant death records were not linked; a record weight was added to the file to compensate for the unlinked records. However, the effect on the rates in this report is minimal.

Infant mortality is a complex problem with limited improvement nationally during the past years, despite the efforts of numerous infant mortality reduction programs (*18,19*). The United States appears unlikely to meet its national health objective for 2010 of an infant mortality rate of 4.5 infant deaths per 1,000 live births (objective 16-1b) or the overarching goal of eliminating disparities among racial/ethnic populations (*20*). The recent plateau in the U.S. infant mortality rate and the longstanding racial/ethnic disparities continue to generate concern among researchers and policymakers. For example, the difference in the infant mortality rate for non-Hispanic whites and non-Hispanic blacks was 138.4% in 2000 and 139.2% in 2006 (Table). Prevention of preterm birth is critical to lowering the overall infant mortality rate and reducing racial/ethnic disparities (*21*).

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Motor Vehicle–Related Deaths — United States, 2003–2007

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Motor vehicle crashes are the leading cause of death for persons in the United States aged 5–34 years (*1*). In 2007, approximately 44,000 persons were killed in motor vehicle crashes, and racial/ethnic minorities were affected disproportionally (*1,2*). Approximately 7% of all American Indian/Alaska Native (AI/AN) deaths and 5% of all Hispanic deaths are attributed to crashes, whereas crashes are the cause of death for<2% of blacks and whites (*2*).

To assess the extent of disparities in motor vehicle–related crashes among persons of all ages, CDC analyzed data from the National Vital Statistics System (NVSS). This report summarizes the results of that analysis, which examined racial/ethnic death rates from motor vehicle crashes by sex. AI/ANs and males had the highest motor vehicle–related death rates. Overall motor vehicle–related mortality can be reduced through increased adoption of evidence-based strategies, including primary seat belt laws (legislation allowing police to stop a vehicle solely for a safety belt violation), legislation for ignition interlock devices (devices that disable a vehicle's ignition after detection of alcohol in the driver's breath), and multicomponent programs with community mobilization (programs that include numerous components such as sobriety checkpoints, education and awareness-raising efforts, and training in responsible beverage service, as well as, an active community coalition) (*3*). Tailoring these strategies to the unique cultures of different racial/ethnic groups also can help reduce disparities in motor vehicle–related mortality (*4,5*).

NVSS data were accessed through the CDC Web-based Injury Statistics Query and Reporting System (WISQARS) online database, which provides customized reports of injury-related mortality data from CDC annual mortality data files (*1*). CDC mortality data are derived from the multiple cause of death data, which are based on death certificate records from vital statistics offices in all 50 states and the District of Columbia. Motor vehicle–related death data were examined for the most recent years available, 2003–2007. Bridged-race postcensal population estimates from the U.S. Census Bureau were used to calculate death rates (*6*). All reported death rates and corresponding confidence intervals are age adjusted to the 2000 standard U.S. population. Differences between death rates in 2003 and 2007 were compared using the z statistic based on a normal approximation, and p values <0.05 were considered statistically significant. Data were examined for all ages by race/ethnicity and sex. NVSS race categories were coded as white, black, AI/AN, and Asian/Pacific Islander (A/PI). Ethnicity was coded separately as Hispanic or non-Hispanic. Race/ethnicity was divided into five mutually exclusive categories: non-Hispanic whites, non-Hispanic blacks, non-Hispanic AI/ANs, non-Hispanic A/PIs, and Hispanics of all races. All Hispanics were grouped in the Hispanic category; therefore, references to race refer to non-Hispanic members of that race (e.g., blacks are non-Hispanic blacks). NVSS does not collect information on other characteristics such as income level; therefore disparities in motor vehicle-related deaths for other characteristics are not included in this report. In addition, this report does not assess geographical variations in death rates.

During 2007, the overall motor vehicle–related age-adjusted death rate was 14.5 deaths per 100,000 population. The death rate was highest among AI/ANs (29.1 per 100,000 population), approximately twice that of whites (15.0 per 100,000 population). For all racial/ethnic groups, males had death rates that were 2–3 times higher than the rates for females (21.5 per 100,000 population versus 8.8 for whites; 23.2 versus 7.3 for blacks; 40.0 versus 18.8 for AI/ANs; 9.5 versus 5.3 for A/PIs; and 19.5 versus 7.0 for Hispanics, for males and females, respectively) (Table, Figure 1).

During 2003–2007, AI/ANs consistently had the highest motor vehicle–related death rates among both males and females (Figures 2 and 3), a finding that is consistent with previous reports (*7*). Among males, AI/ANs had rates that were 2–4 times higher than the rates of other races/ethnicities, with annual rates of approximately 43 deaths per 100,000 population per year (Figure 2). Black males had the second-highest death rates (approximately 23 deaths per 100,000 population per year), followed by whites and Hispanics, who had similar rates (both approximately 21 deaths per 100,000 population per year). A/PI males consistently had the lowest death rates, with rates that were half those of whites and Hispanics (approximately 9–10 deaths per 100,000 population per year).

Among females, AI/ANs also had the highest motor vehicle–related death rates, with approximately 21 deaths per 100,000 population per year (Figure 3). White females had the second-highest death rates (approximately nine deaths per 100,000 population per year), followed by blacks and Hispanics, with A/PIs again having the lowest death rates (approximately six deaths per 100,000 population per year).

From 2003 to 2007, age-adjusted death rates remained relatively stable among all men except Hispanics (Table). Death rates among Hispanic men decreased significantly from 22.2 in 2003 to 19.5 in 2007 (p<0.001). Death rates for women of all races/ethnicities decreased significantly from 2003 to 2007, with the greatest decrease occurring among AI/AN women, whose death rate decreased from 25.0 in 2003 to 18.8 in 2007 (p<0.001).

During a motor vehicle crash, seat belts are one of the most effective tools available for avoiding severe injury and saving lives (*8*). Seat belt use has increased during the past 2 decades, from 58% in 1994 to 84% in 2009; however, millions of vehicle occupants still do not use belts (*9,10*). Racial/ethnic groups with the highest

TABLE. Number and rate* of motor vehicle–related deaths, by race/ethnicity and sex — National Vital Statistics System, United States, 2003–2007

Race/Ethnicity and sex	2003			2004			2005			2006			2007			p value for difference between 2003 and 2007†
	No. of deaths	Rate	(95% CI)	No. of deaths	Rate	(95% CI)	No. of deaths	Rate	(95% CI)	No. of deaths	Rate	(95% CI)	No. of deaths	Rate	(95% CI)	
White, non-Hispanic	31,780	15.6	(15.4–15.8)	32,068	15.7	(15.5–15.8)	32,131	15.6	(15.4–15.8)	31,688	15.3	(15.2–15.5)	31,031	15.0	(14.8–15.1)	<0.001
Male	21,391	21.8	(21.5–22.1)	21,640	21.9	(21.6–22.1)	22,084	22.1	(21.8–22.4)	21,737	21.6	(21.3–21.9)	21,657	21.5	(21.2–21.7)	0.15
Female	10,389	9.8	(9.6–10.0)	10,428	9.8	(9.6–10.0)	10,047	9.4	(9.2–9.6)	9,951	9.3	(9.2–9.5)	9,374	8.8	(8.6–8.9)	<0.001
Black, non-Hispanic	5,368	15.3	(14.9–15.8)	5,410	15.1	(14.7–15.5)	5,412	14.9	(14.5–15.4)	5,567	15.1	(14.7–15.5)	5,432	14.6	(14.2–14.9)	0.02
Male	3,784	23.5	(22.7–24.3)	3,831	23.3	(22.5–24.1)	3,896	23.3	(22.6–24.1)	4,002	23.4	(22.7–24.2)	3,989	23.2	(22.4–24.0)	0.59
Female	1,584	8.6	(8.1–9.0)	1,579	8.3	(7.9–8.7)	1,516	7.9	(7.5–8.3)	1,565	8.0	(7.6–8.4)	1,443	7.3	(6.9–7.7)	<0.001
American Indian/ Alaska Native	833	34.8	(32.3–37.2)	768	32.2	(29.9–34.6)	766	30.6	(28.3–32.8)	831	33.0	(30.7–35.3)	742	29.1	(26.9–31.2)	<0.001
Male	539	44.7	(40.7–48.7)	502	43.1	(39.1–47.1)	529	42.7	(38.9–46.5)	563	45.8	(41.8–49.7)	497	40.0	(36.3–43.6)	0.89
Female	294	25.0	(22.0–27.9)	266	22.0	(19.3–24.8)	237	18.9	(16.4–21.4)	268	20.9	(18.3–23.4)	245	18.8	(16.4–21.2)	0.001
Asian/ Pacific Islander	1,017	8.6	(8.1–9.2)	971	7.9	(7.3–8.4)	968	7.7	(7.2–8.2)	989	7.6	(7.1–8.1)	961	7.3	(6.8–7.7)	<0.001
Male	591	10.5	(9.6–11.4)	567	9.5	(8.7–10.3)	582	9.7	(8.9–10.5)	602	9.6	(8.8–10.4)	594	9.5	(8.7–10.3)	0.11
Female	426	7.0	(6.3–7.7)	404	6.4	(5.7–7.0)	386	5.9	(5.3–6.5)	387	5.8	(5.2–6.3)	367	5.3	(4.8–5.9)	<0.001
Hispanic	5,775	15.3	(14.8–15.7)	5,761	14.6	(14.2–15.0)	6,126	14.8	(14.4–15.3)	6,313	14.8	(14.4–15.2)	5,846	13.4	(13.0–13.7)	<0.001
Male	4,358	22.2	(21.4–23.0)	4,337	21.1	(20.4–21.8)	4,589	21.4	(20.7–22.1)	4,779	21.5	(20.8–22.2)	4,409	19.5	(18.8–20.1)	<0.001
Female	1,417	8.1	(7.7–8.6)	1,424	7.8	(7.3–8.2)	1,537	7.9	(7.5–8.4)	1,534	7.8	(7.4–8.2)	1,437	7.0	(6.6–7.4)	<0.001

Abbreviation: CI = confidence interval.

* Age-adjusted death rate per 100,000 population.

† p value for t-test comparing 2003 and 2007 rates.

FIGURE 1. Motor vehicle–related death rates, by sex and race/ethnicity — National Vital Statistics System, United States, 2007

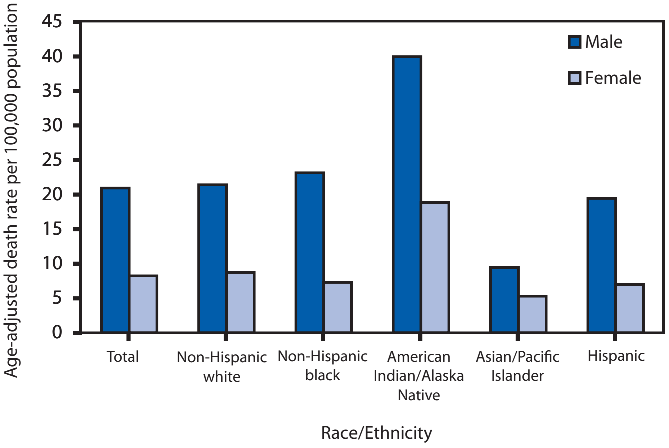


FIGURE 2. Motor vehicle–related death rates among males, by race/ethnicity — National Vital Statistics System, United States, 2003–2007

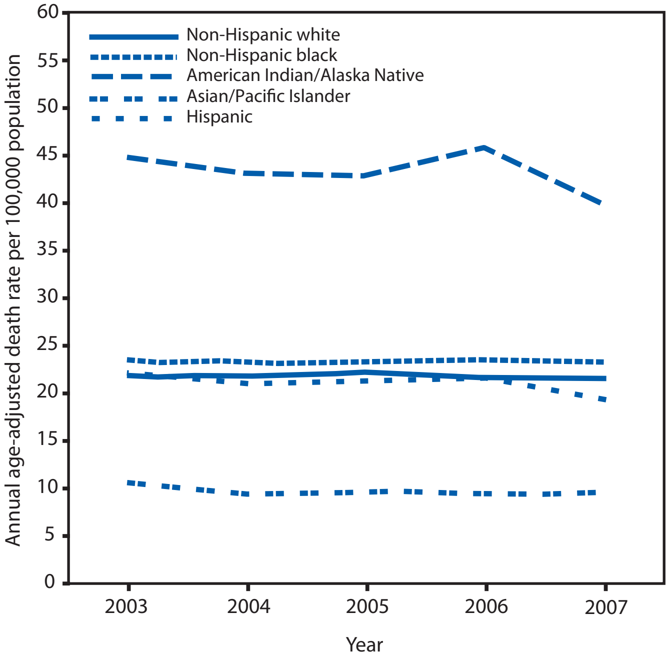
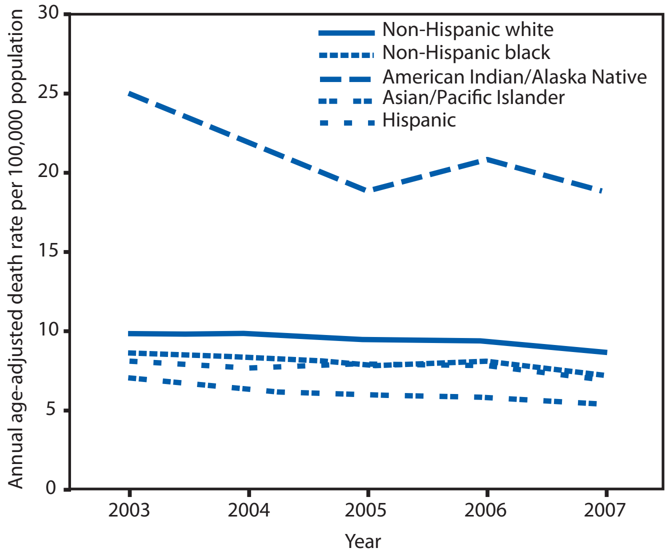


FIGURE 3. Motor vehicle–related death rates among females, by race/ethnicity — National Vital Statistics System, United States, 2003–2007



death rates also have higher proportions of risky motor vehicle behaviors, including seat belt nonuse and alcohol-impaired driving. For example, among persons killed in crashes, AI/ANs had the highest percentage of seat belt nonuse (75% of passenger vehicle occupants) followed by blacks (62%); A/PIs had the lowest percentage of nonuse (31%) (*11*).

Within racial/ethnic groups, driver age is also an important factor affecting the likelihood of restraint use. Although adolescents have the highest percentage of restraint nonuse overall, the percentages vary by racial/ethnic group. Among students in grades 9–12, AI/ANs have the highest percentage of self-reported seat belt nonuse (13.6%), followed by blacks (11.7%), whites (9.5%), Hispanics (8.8%), and Asians (7.0%) (*12*). Moreover, in fatal crashes for which restraint use is known, black youths aged 15–20 years have the highest percentage of seat belt nonuse or incorrect belt use (69.8%), followed by AI/ANs (68.5%), Hispanics (64.5%), whites (58.9%), and A/PIs (56.1%) (*13*).

Similarly, restraint use among children differs by race/ethnicity and age, with younger children having higher rates of restraint use (*14*). Depending on race/ethnicity, children aged <1 year have restraint use ranging from 94% to 100%, whereas children aged 8–12 years have restraint use ranging from 72% to 91%. White and Asian children have higher restraint use rates than black and Hispanic children (*14*). Among children killed in crashes and for which restraint use is known, black children have the highest percentage of restraint nonuse; 52% of black children were unrestrained at the time of a fatal crash (*11*).

In addition to differences in restraint use, racial/ethnic groups with the highest motor vehicle–related death rates also have higher proportions of alcohol-involved motor vehicle–related crash deaths. In 2006, among all persons killed in crashes, AI/ANs had the highest proportion killed in alcohol-impaired crashes (48%), followed by Hispanics (36%), blacks and whites (both 31%), and A/PIs (23%) (*11*).

Enacting primary seat belt laws where needed and strong enforcement of such legislation can help reduce sex and racial/ethnic disparities in motor vehicle–related mortality (*3,15*). The highest reported seat belt use rates are observed in states and on tribal reservations with primary seat belt laws, followed by those with secondary seat belt laws (legislation allowing police to administer a citation for a seat belt violation only after the vehicle has been stopped for another reason) (*16,17*). Nineteen states do not have primary seat belt legislation in place (*18*). For children, safety seats reduce the risk for death among infants aged <1 year by 71% and reduce the risk for toddlers aged 1–4 years by 54% (*19*). For children aged 4–7 years, booster seats can reduce the risk for death by 59%, compared with seat belts alone (*20*). Focused child restraint distribution and education programs can help increase restraint use among children of minority races/ethnicities (*3,5*). In addition, evidence-based strategies can be used to reduce the incidence of alcohol-impaired driving. Successful strategies include sobriety checkpoints, multicomponent programs with community mobilization, minimum drinking age (21 years) laws, 0.08 g/dL blood alcohol concentration laws, and ignition interlock programs (*3*).

The findings in this report are subject to at least one limitation. Because NVSS data are extracted from death certificates and are not self-reported, some racial misclassification is likely, particularly for AI/ANs (*21*).

Although motor vehicle safety interventions have been tailored to communities of different racial/ethnic and cultural backgrounds successfully, additional translational research is needed regarding scalability of these interventions (*4,5*). Additional programs for and research on increasing seat belt use, child safety seat use, and reducing alcohol-impaired driving among minority groups are necessary to eliminate these disparities.

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Suicides — United States, 1999–2007

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Injury from self-directed violence, which includes suicidal behavior and its consequences, is a leading cause of death and disability. In 2007, suicide was the 11th leading cause of death in the United States and the cause of 34,598 deaths (*1*). In 2000, the estimated cost of self-directed violence (fatal and nonfatal) was $33 billion ($32 billion in productivity losses and $1 billion in medical costs) (*2*). Suicide rates are influenced by biological, psychological, social, moral, political, and economic factors (*3*). Self-directed violence in the United States affects all racial/ethnic groups but often is misperceived to be a problem solely affecting non-Hispanic white males (*4*).

To determine differences in the prevalence of suicide by sex, race/ethnicity, age, and geographic region in the United States, CDC analyzed 1999–2007 data from the Web-based Injury Statistics Query and Reporting System — Fatal (WISQARS Fatal) (*5*) and the National Vital Statistics System (NVSS). Mortality data originate from NVSS, which collects death certificate data filed in the 50 states and the District of Columbia (*1*). Data in this report were based on suicides from any cause and include the 1999–2007 data years. The WISQARS database contains mortality data based on NVSS and population counts for all U.S. counties based on U.S. Census data. Counts and rates of death can be obtained by underlying cause of death, mechanism of injury, state, county, age, race, sex, year, injury cause of death (e.g., firearm, poisoning, or suffocation) and by manner of death (e.g., suicide, homicide, or unintentional injury) (*4*).

Unadjusted (crude) death rates were based on resident population data from the U.S. Census Bureau (*5*). Confidence intervals were calculated in two ways: 1) groupings of <100 deaths were calculated by using the gamma method (*1*), and 2) groupings of ≥100 deaths were calculated by using a normal approximation (*1*).

NVSS codes racial categories as white, black, American Indian/Alaskan Native (AI/AN), and Asian/Pacific Islander (A/PI); ethnicity is coded separately as Hispanic or non-Hispanic (*1*). All references to a specific race refer to non-Hispanic members (e.g., non-Hispanic white and non-Hispanic black). Differences in rates between two populations were compared using the z statistic based on a normal approximation at a critical value of $\alpha = 0.05$ (*1*). Because coding of the mortality data changed to the *International Classification of Diseases, Tenth Revision* (ICD-10) beginning in 1999, analyses by year and race/ethnicity were conducted for 1999–2007 to examine rate changes during that period. To compare differences in rates across the years 1999–2007, trend analyses to test statistical significance were conducted using a negative binomial rate regression model (*6*).

In 2007, a total of 34,598 suicides occurred in the United States; 83.5% of suicides were among whites, 7.1% among Hispanics, 5.5% among blacks, 2.5% among A/PIs, and 1.1% among AI/ANs (Table). Although AI/ANs represented the smallest proportion of suicides of all racial/ethnic groups, they shared the highest rates with whites. Overall, the suicide rate for males (18.4 per 100,000 population) was approximately 4 times (383%) greater than for females (4.8 per 100,000 population). In each of the racial/ethnic groups, suicide rates were higher for males than for females, but the male-female ratio for suicide differs among these groups. Among whites, the male-female ratio was 3.8; among Hispanics, 5.0; among blacks, 5.0; among A/PIs, 2.4; and among AI/ANs, 3.7. During 2007, 4,754 (13.7%) suicides occurred in the Northeast, 7,515 (21.7%) in the Midwest, 8,940 (25.8%) in the West, and 13,389 (38.7%) in the South (Table). Regional crude suicide rates were significantly higher for persons living in the West (12.8 per 100,000 population), followed by the South (12.1), Midwest (11.3), and Northeast (8.7). An assessment of trends for the years 1999–2007 showed increases for AI/ANs ($p<0.001$) and whites ($p<0.001$) and decreases for blacks ($p<0.001$); no significant changes occurred in trends for rates among Hispanics and A/PIs.

Suicide rates by race/ethnicity and age group demonstrated different patterns by racial/ethnic group, with the highest rates occurring among AI/AN adolescents and young adults (Figure). Rates among AI/ANs, blacks, and Hispanics tended to be highest among adolescents and young adults, then declined or leveled off with increasing age. In contrast, rates among whites were highest among those aged 40–54 years. Among A/PIs, rates were highest for persons aged ≥65 years. Although the overall rates for AI/ANs were similar to those of whites, the rates among adolescent and young adult AI/ANs aged 15–29 years were substantially higher. AI/AN youths had substantially greater rates of suicide than young persons of other racial/ethnic groups. In addition, suicide ranked as the fourth leading cause of years of potential life lost (YPLL) among AI/ANs, accounting for 7.5% of all YPLL among AI/ANs (*5*). Multiple factors contribute to the high rates of suicide among AI/AN populations, including individual-level factors (e.g., alcohol and substance misuse and mental illness), family- or peer-level factors (e.g., family disruption or suicidal behavior of others), and societal-level factors (e.g., poverty, unemployment, discrimination, and historical trauma [i.e., cumulative emotional and psychological wounding across generations]) (*7*). Although certain protective factors exist within AI/AN communities, including spirituality and cultural continuity, the factors are often outweighed by the magnitude of the risk factors (*7*). The regional differences found in this report are consistent with

TABLE. Number and rate[*] of suicides, by age group, race/ethnicity, and sex — National Vital Statistics System, United States, 2007

	Male			Female			Total			
Characteristic	No. of deaths	Rate	(95% CI)[†]	No. of deaths	Rate	(95% CI)[†]	No. of deaths	Rate	(95% CI)[†]	Percentage of total
Age group (yrs)										
0–4	0	—[§]	—	0	—	—	**0**	**—**	**—**	**—**
5–9	3	—	—	1	—	—	**4**	**—**	**—**	**—**
10–14	128	1.2	(1.0–1.5)	52	0.5	(0.4–0.7)	**180**	**0.9**	**(0.8–1.0)**	**0.5**
15–19	1,221	11.1	(10.5–11.7)	260	2.5	(2.2–2.8)	**1,481**	**6.9**	**(6.6–7.3)**	**4.3**
20–24	2,260	20.9	(20.1–21.8)	399	3.9	(3.5–4.3)	**2,659**	**12.7**	**(12.2–13.2)**	**7.7**
25–29	2,190	20.4	(19.6–21.3)	483	4.7	(4.3–5.1)	**2,673**	**12.8**	**(12.3–13.2)**	**7.7**
30–34	2,091	21.2	(20.3–22.1)	514	5.4	(4.9–5.8)	**2,605**	**13.4**	**(12.9–13.9)**	**7.5**
35–39	2,360	22.2	(21.3–23.1)	662	6.3	(5.8–6.8)	**3,022**	**14.3**	**(13.8–14.8)**	**8.7**
40–44	2,792	25.5	(24.6–26.4)	908	8.3	(7.7–8.8)	**3,700**	**16.9**	**(16.3–17.4)**	**10.7**
45–49	3,043	26.9	(26.0–27.9)	1,008	8.7	(8.2–9.2)	**4,051**	**17.7**	**(17.2–18.3)**	**11.7**
50–54	2,781	27.0	(26.0–28.0)	946	8.8	(8.3–9.4)	**3,727**	**17.7**	**(17.2–18.3)**	**10.8**
55–59	2,212	25.0	(24.0–26.0)	750	8.0	(7.4–8.6)	**2,962**	**16.2**	**(15.7–16.8)**	**8.6**
60–64	1,614	23.3	(22.2–24.4)	493	6.5	(6.0–7.1)	**2,107**	**14.6**	**(13.9–15.2)**	**6.1**
65–69	1,125	22.4	(21.1–23.7)	257	4.5	(3.9–5.0)	**1,382**	**12.9**	**(12.2–13.5)**	**4.0**
70–74	878	22.7	(21.2–24.2)	184	3.9	(3.3–4.5)	**1,062**	**12.3**	**(11.6–13.1)**	**3.1**
75–79	1,032	33.1	(31.1–35.2)	171	4.1	(3.4–4.7)	**1,203**	**16.4**	**(15.5–17.3)**	**3.5**
80–84	792	35.8	(33.3–38.3)	124	3.5	(2.9–4.2)	**916**	**16.0**	**(15.0–17.1)**	**2.6**
≥85	742	41.8	(38.8–44.8)	116	3.1	(2.5–3.7)	**858**	**15.6**	**(14.5–16.6)**	**2.5**
Unknown	5	—	—	1	—	—	**6**	**—**	**—**	**<0.1**
Geographic region[¶]										
Northeast	3,768	14.1	(13.7–14.6)	986	3.5	(3.3–3.7)	**4,754**	**8.7**	**(8.4–8.9)**	**13.7**
South	10,475	19.3	(18.9–19.7)	2,914	5.2	(5.0–5.4)	**13,389**	**12.1**	**(11.9–12.3)**	**38.7**
Midwest	6,036	18.5	(18.0–18.9)	1,479	4.4	(4.2–4.6)	**7,515**	**11.3**	**(11.1–11.6)**	**21.7**
West	6,990	20.0	(19.5–20.5)	1,950	5.6	(5.3–5.8)	**8,940**	**12.8**	**(12.5–13.1)**	**25.8**
Race/Ethnicity[**]										
White, non-Hispanic	22,660	22.9	(22.6–23.2)	6,237	6.1	(5.9–6.2)	**28,897**	**14.4**	**(14.2–14.5)**	**83.5**
Black, non-Hispanic	1,571	8.7	(8.3–9.1)	345	1.7	(1.6–1.9)	**1,916**	**5.1**	**(4.8–5.3)**	**5.5**
American Indian/Alaska Native	290	23.2	(20.5–25.9)	80	6.2	(4.9–7.7)	**370**	**14.6**	**(13.1–16.0)**	**1.1**
Asian/Pacific Islander	612	8.9	(8.2–9.6)	266	3.7	(3.2–4.1)	**878**	**6.2**	**(5.8–6.6)**	**2.5**
Hispanic	2,078	8.9	(8.5–9.2)	387	1.8	(1.6–1.9)	**2,465**	**5.4**	**(5.2–5.6)**	**7.1**
Unknown	58	—	—	14	—	—	**72**	**—**	**—**	**0.2**
Total	**27,269**	**18.4**	**(18.2–18.6)**	**7,329**	**4.8**	**(4.7–4.9)**	**34,598**	**11.5**	**(11.4–11.6)**	**100.0**

Abbreviation: CI = confidence interval.

[*] Unadjusted (crude) death rates per 100,000 population.

[†] CIs based on <100 deaths were calculated by using a gamma method; CIs based on ≥100 deaths were calculated by using a normal approximation. (Additional information available from Xu J, Kochanek KD, Murphy SL, Tejada-Vera B. Deaths: final data for 2007. Hyattsville, MD: US Department of Health and Human Services, CDC, National Center for Health Statistics; 2010. National Vital Statistics Reports Vol. 58, No. 19. Available at http://www.cdc.gov/nchs/data/nvsr/nvsr58/nvsr58_19.pdf.

[§] Rates based on <20 deaths were considered unreliable and not included in the analysis.

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

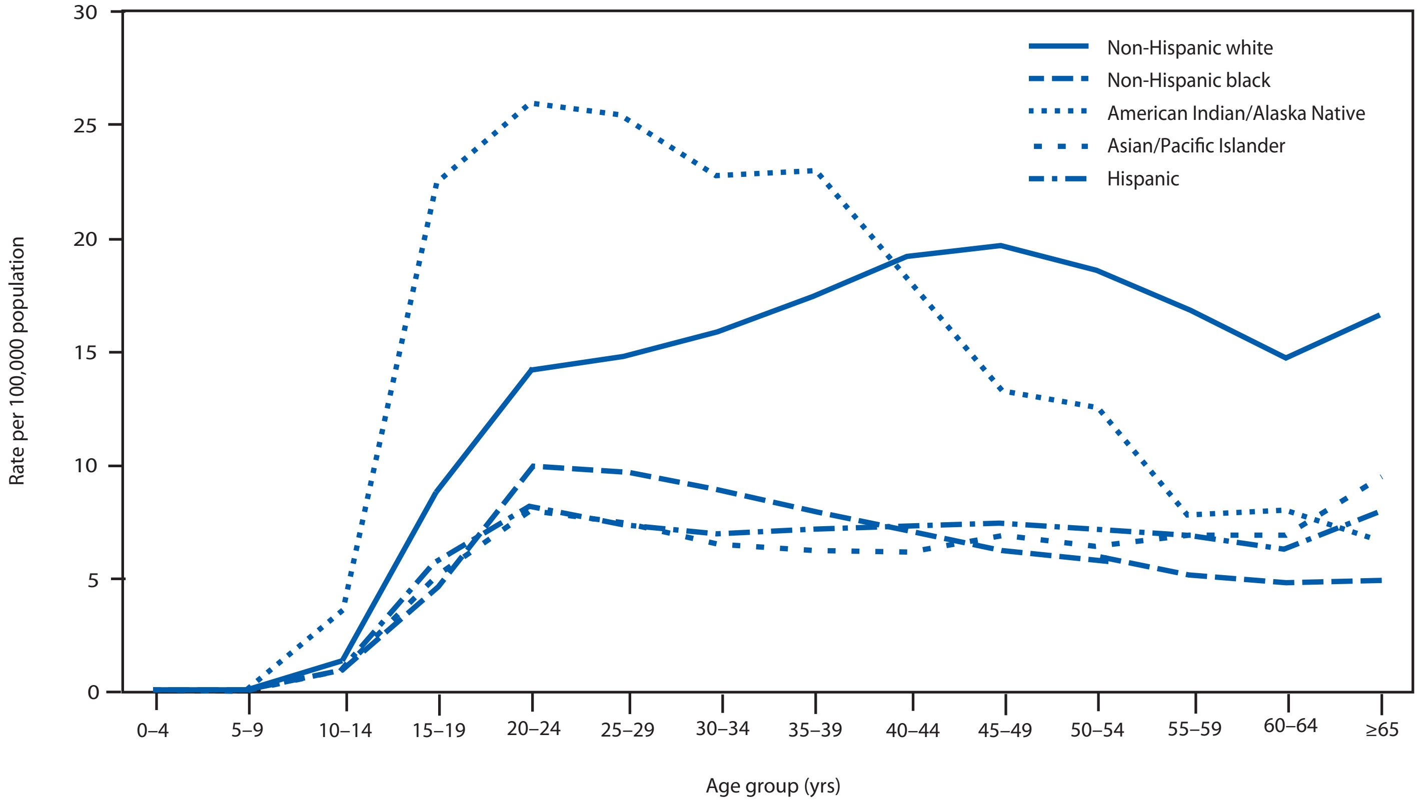
[**] Rates for persons with unknown race/ethnicity were not included because population data were unavailable.

previous studies conducted in the United States (*8*). These studies have shown that regional differences in demographic patterns (i.e., age, race/ethnicity, and sex) and in suicide methods do not account completely for variations in suicide.

Suicide prevention efforts throughout the United States tend to focus on counseling, education, and clinical intervention strategies for persons at risk for suicide (*3*). Although these approaches provide limited individual protection, they also require high levels of effort and commitment and might have a limited population-level impact, a critical goal of public health (*9*). In contrast, strategies that seek to address societal-level factors demonstrated to be associated with suicide (e.g., economic strain, poverty, and misuse of alcohol and other psychoactive substances) and improving the health system infrastructure in impoverished and underserved communities to address this problem might have a greater effect but need additional development and testing (*9*).

The findings presented in this report are subject to at least two limitations. First, the number of suicides is undercounted in the database (and such undercounts have not changed in recent years) (*10*); therefore, the suicide rates in this report are likely to be underestimates. Second, injury mortality data likely underestimate by 25%–35% the actual numbers of deaths for AI/ANs and certain other racial/ethnic populations (e.g., Hispanics) because of the misclassification of race/ethnicity of decedents on death certificates (*11*).

FIGURE. Suicide rates,* by race/ethnicity and age group — United States, National Vital Statistics System, 1999–2007



*Unadjusted (crude) death rates per 100,000 population.

Because the variables included in U.S. mortality data are limited, the results cannot be used to determine potential factors related to such disparities as mental or physical disability, sexual orientation, or income. Other data sources (e.g., the National Violent Death Reporting System) that collect a broader array of information about the circumstances surrounding suicides and other violent deaths can provide additional insight for suicide prevention programs (*12*).

Effective, comprehensive suicide prevention programs focus on risk and protective factors, including coping skills, access to mental health treatment, substance misuse, and social support; however, only a limited number have been developed specifically for selected populations (*3*). An example of a comprehensive prevention program that has been reported to reduce suicidal behavior within an AI/AN community is the Natural Helpers Program (*13*). This multicomponent program involves personnel who are trained to respond to adolescents and young adults in crisis, notify mental health professionals in the event of a crisis, and provide health education in the schools and community. Other program components include outreach to families after a suicide or other traumatic death, immediate response and follow-up for youths reported to be at risk, alcohol and substance abuse programs, community education about suicide prevention, and suicide-risk screening in mental health and social service programs.

To reduce the rates of suicide among groups that are affected disproportionately, substantial public health investments are needed to address the health and well-being of persons at risk and to support the widespread implementation of culturally relevant and effective programs. Prevention efforts and resources also should be directed toward adults aged 40–54 years, the population that recently has had increases in suicides but often is overlooked as a specific group for prevention efforts (*14*).

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Drug-Induced Deaths — United States, 2003–2007

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Drug-induced deaths include all deaths for which drugs are the underlying cause (*1*), including deaths attributable to acute poisoning by drugs (drug overdoses) and deaths from medical conditions resulting from chronic drug use. A drug includes illicit or street drugs (e.g., heroin or cocaine), as well as legal prescription drugs and over-the-counter drugs; alcohol is not included. The majority of deaths are unintentional drug poisoning deaths, with suicidal drug poisoning and drug poisoning of undetermined intent comprising the majority of the remainder (*2*). Adverse effects from drugs taken as directed and infections resulting from drug use are not included. In 2007, drug-induced deaths were more common than alcohol-induced or firearm-related deaths in the United States (*1*).

To examine trends and assess drug-induced deaths during 2003–2007 in the United States, CDC analyzed data from the mortality component of the National Vital Statistics System. Death certificates provide information on the sex, race, and ethnicity of the decedent; they do not provide information on decedent income. Deaths with underlying causes that are defined as drug induced by CDC are included in the category (*1*). Age-adjusted rates were calculated per 100,000 persons on the basis of U.S Census populations with bridged-race categories. Unadjusted rate ratios were calculated to compare 2007 to 2003 rates and to compare nonwhite with white rates. Rates were not compared by geographic region.

During 2007 (the year in which the latest national NVSS mortality data are available), a total of 38,371 drug-induced deaths occurred in the United States (Table). Drug-induced mortality rates increased during 2003–2006 and declined slightly in 2007. During all years, rates for males exceeded those for females. During 2007, rates for non-Hispanic white males (18.7 per 100,000 population) were 64.0% greater than those for non-Hispanic white females (11.4 per 100,000). Drug-induced mortality rate increases were greatest for non-Hispanic whites, whereas rates for Hispanics did not increase with time. The highest rates overall were among non-Hispanic whites for each year examined. Asians/Pacific Islanders had markedly lower rates than all other groups. For females, the highest rates were among American Indians/Alaskan Natives for every year

TABLE. Age-adjusted drug-induced death rates[*] — National Vital Statistics System, United States, 2003–2007

Sex and race/ethnicity	Drug-induced death rate						2007 Ratio of other races to whites
	2003	2004	2005	2006	2007	2007–2003 Ratio	
Female							
White[†]	7.4	8.1	8.7	9.8	10.2	1.4	Ref.
Black[†]	6.4	6.6	7.2	7.7	7.3	1.1	0.7
American Indian/Alaska Native	8.6	9.4	10.4	10.5	11.5	1.3	1.1
Asian/Pacific Islander	1.3	1.2	1.4	1.7	1.7	1.3	0.2
White, non-Hispanic	8.0	8.9	9.6	10.8	11.4	1.4	
Black, non-Hispanic	6.6	6.8	7.4	7.9	7.5	1.1	
Hispanic	3.3	3.4	3.5	3.9	3.4	1.0	
Total	**7.0**	**7.6**	**8.1**	**9.0**	**9.3**	**1.3**	
Male							
White[†]	13.4	13.9	15.1	17.1	16.9	1.3	Ref.
Black[†]	14.1	14.3	15.8	18.9	15.4	1.1	0.9
American Indian/Alaska Native	11.2	13.8	13.4	16.3	12.6	1.1	0.7
Asian/Pacific Islander	1.9	2.5	2.6	3.0	2.3	1.2	0.1
White, non-Hispanic	14.1	15.0	16.2	18.6	18.7	1.3	
Black, non-Hispanic	14.4	14.6	16.1	19.4	15.8	1.1	
Hispanic	9.9	8.9	10.0	10.3	9.5	1.0	
Total	**12.8**	**13.3**	**14.4**	**16.4**	**15.8**	**1.2**	
Both sexes							
White[†]	10.4	11.1	11.9	13.5	13.6	1.3	Ref.
Black[†]	9.9	10.1	11.2	12.9	11.0	1.1	0.8
American Indian/Alaska Native	9.9	11.6	11.9	13.4	12.1	1.2	0.9
Asian/Pacific Islander	1.6	1.8	1.9	2.3	2.0	1.3	0.1
White, non-Hispanic	11.0	12.0	12.8	14.7	15.1	1.4	
Black, non-Hispanic	10.1	10.4	11.4	13.2	11.4	1.1	
Hispanic	6.7	6.2	6.8	7.2	6.5	1.0	
Total	**9.9**	**10.4**	**11.3**	**12.7**	**12.6**	**1.3**	

[*] Per 100,000 population. Based on U.S. Census populations with bridged-race categories. Additional information available at http://www.cdc.gov/nchs/nvss/bridged_race.htm.

[†] Hispanic and non-Hispanic.

except 2006. For males, the highest rates were among non-Hispanic blacks or non-Hispanic whites each year.

During the 1980s and 1990s, when the majority of drug-induced deaths were attributable to illicit drugs (e.g., heroin and cocaine), drug-induced mortality rates were higher among blacks than whites (*2*). However, in 2002, rates for whites surpassed those for blacks (*2*). This change occurred as prescription drugs, especially prescription opioid painkillers and psychotherapeutic drugs, were prescribed more widely by physicians. Prescribed drugs eventually supplanted illicit drugs as the leading cause of drug-related overdose deaths (*3*). Members of racial/ethnic minorities might have been less affected by this change because they are less likely to use prescription drugs and therefore might have been less likely to misuse such drugs (*4*). Studies of primarily white populations report that drug-related overdose death rates are highest among low-income persons; however, the reasons are unclear (*5,6*).

The findings in this report are subject to at least three limitations. First, because of the stigma associated with drug abuse, drug-induced death rates are likely to be underestimates. Whether the percentage of ascertainment varies by race/ethnicity is unknown. Second, because death certificate data are not timely, the differences noted in this report might have changed in subsequent years given the marked changes that occurred during 2003–2007. Finally, injury mortality data likely underestimate by 25%–35% the actual numbers of deaths for American Indian/Alaskan Natives and certain other racial/ethnic populations (e.g., Hispanics) because of the misclassification of race/ethnicity of decedents on death certificates (*7*).

Despite the lower income levels of most racial minorities, they are not more likely than whites to die from the effects of drugs. However, all racial/ethnic groups other than Hispanics have had increases in drug-induced death rates in recent years. Physicians should follow existing guidelines for cautious use of prescription drugs that tend to be misused by patients. Regulations designed to prevent illicit use of prescription drugs need to be strengthened and enforced. Persons who misuse prescription drugs should be identified and receive a referral for substance abuse treatment.

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Coronary Heart Disease and Stroke Deaths — United States, 2006

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Heart disease and stroke are the first and third leading causes of death in the United States* (*1*) and have maintained this ranking since 1921 and 1938, respectively (*2*). In 2006, cardiovascular disease was responsible for 31.7% of all deaths: 26.0% from heart disease and 5.7% from stroke (*1*). Deaths from coronary heart disease (CHD) (425,425 deaths) comprise 67.4% of all deaths from heart disease (631,636 deaths). The *Healthy People 2010* objectives of reducing death rates to 162 deaths per 100,000 population for CHD and 50 deaths per 100,000 for stroke (objectives 12-1 and 12-7) were met in 2004 (*3*). However, despite the overall decrease in CHD and stroke death rates, the target death rates for both diseases were not met for two subpopulations: blacks and men.

Healthy People 2020 has four overarching goals: 1) eliminate preventable disease, disability, injury, and premature death; 2) achieve health equity, eliminate disparities, and improve the health of all groups; 3) create social and physical environments that promote good health for all; and 4) promote healthy development and healthy behaviors across every life stage (*4*). Examining and monitoring the distribution of death rates provides the requisite information for focusing on the groups most in need of early intervention to eliminate preventable disease, disability, and premature death and to improve the health of all groups.

To examine CHD and stroke death rates among different segments of the U.S. population, CDC analyzed 2006 data from the National Vital Statistics System (NVSS). NVSS is maintained by CDC and compiles data from vital records on all deaths occurring annually in the United States (*5*). The 2006 CDC Wonder compressed mortality NVSS database (*6*) was used to obtain the number of deaths for which CHD or stroke was the underlying cause, population estimates for calculation of rates, and mortality rates per 100,000, age-standardized to the 2000 U.S. standard population (*7*). The underlying cause of death is the disease that initiated the sequence of events leading directly to death. Age-specific rate calculations were restricted to adults aged ≥45 years because 98.1% of CHD deaths and 97.6% of stroke deaths occurred among persons in this age group. CHD and stroke deaths were classified according to codes from the *International Classification of Diseases, Tenth Revision* (ICD-10) (*8*). The category of CHD (ICD-10 codes I20–I25) includes acute myocardial infarction, angina pectoris, atherosclerotic cardiovascular disease, and all other forms of acute and chronic ischemic heart disease. Stroke (ICD-10 codes I60–I69) includes ischemic and hemorrhagic strokes, strokes not specified as ischemic or hemorrhagic, and other cerebrovascular diseases (e.g., occlusion and stenosis of cerebral arteries) not resulting in cerebral infarction. Substantial differences in rates were determined by nonoverlapping confidence intervals (CIs), and these differences are discussed in the report; however, nonoverlapping CIs were not used as an indicator of statistical significance.

Trends in mortality disparities for CHD and stroke over time were not examined. In addition, death rates by educational attainment were not included because education information on the death certificates is unreliable, particularly for certain demographic groups (blacks, Hispanics, and Asians/Pacific Islanders [A/PIs]) (*9*).

In 2006, CHD was the underlying cause of death for 425,425 persons (all ages) in the United States; the age-adjusted mortality rate was 135.0 deaths per 100,000 standard population (Table 1). The rate for males was 41.6% higher than for females (176.5 versus 103.1 per 100,000 population, respectively). Blacks had higher age-adjusted rates than the other three racial/ethnic groups, and whites had higher rates than American Indians/Alaska Natives (AI/ANs) and A/PIs (Table 1).

In 2006, stroke was the underlying cause of death for 137,119 persons; the age-adjusted mortality rate was 43.6 per 100,000 standard population (Table 1). Rates for blacks were 32.3% higher than rates for whites (61.6 versus 41.7 per 100,000 population, respectively). Hispanics had lower death rates for both CHD and stroke than non-Hispanics.

The age-specific CHD mortality rates by sex, race/ethnicity, and age group highlight how the overall age-adjusted rate masks the differences in higher premature death rates (death before age 75 years) within the groups (Table 2). Among adults aged ≥45 years, a comparison of rates by race for the youngest age groups reveals that black women and men aged 45–74 years had much higher CHD death rates than women and men of the three other races. The proportion of CHD deaths that occurred among persons aged 45–74 years was higher for black women (37.9%) than white women (19.4%) and higher for black men (61.5%) than white men (41.5%). Non-Hispanic men and women aged 45–74 years had higher CHD death rates than their Hispanic counterparts (Table 3).

The pattern in premature death rates also is demonstrated in age-specific deaths caused by stroke (Table 4). Approximately 39% of black women who died of stroke died before age 75 years, compared with 17.3% of white women; 60.7% of black men who died of stroke died before age 75 years, compared with 31.1% of white men. Age-specific stroke death rates were similar for Hispanics and non-Hispanics (Table 5).

CHD and stroke age-adjusted mortality rates were also examined by state (Table 6). The range for CHD was from 77.5 deaths per 100,000 population (Utah) to 193.5 per 100,000 (District of

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* Preliminary data for 2008 indicate that stroke might now be the fourth leading cause of death in the United States. However, these data should be interpreted with caution. (Data available at http://www.cdc.gov/nchs/data/nvsr/nvsr59/nvsr59_02.pdf.)

TABLE 1. Number of deaths and age-adjusted death rates* for coronary heart disease and stroke, by sex and race/ethnicity — National Vital Statistics System, United States, 2006

	Coronary heart disease			Stroke		
Characteristic	**No.**	**Rate**	**(95% CI)**	**No.**	**Rate**	**(95% CI)**
Sex						
Female	200,915	103.1	(102.7–103.6)	82,595	42.6	(42.3–42.9)
Male	224,510	176.5	(175.7–177.2)	54,524	43.9	(43.5–44.3)
Race						
American Indian/Alaska Native	1,880	97.4	(92.8–102.0)	548	29.4	(26.9–32.0)
Asian/ Pacific Islander	7,570	77.1	(75.4–78.9)	3,662	37.0	(35.8–38.2)
Black	44,530	161.6	(160.1–163.1)	17,045	61.6	(60.7–62.6)
White	371,445	134.2	(133.8–134.6)	115,864	41.7	(41.5–42.0)
Ethnicity						
Hispanic	20,939	106.4	(104.9–107.8)	7,005	34.2	(33.4–35.0)
Non-Hispanic	403,588	136.8	(136.4–137.3)	129,892	44.0	(43.8–44.3)
Total	**425,425**	**135.0**	**(134.6–135.4)**	**137,119**	**43.6**	**(43.3–43.8)**

Abbreviation: CI = confidence interval.
*Per 100,000 U.S. standard population.

TABLE 2. Number of deaths and age-specific death rates* for coronary heart disease among adults aged ≥45 years, by age group, sex, and race — National Vital Statistics System, United States, 2006

	Race											
Age group	**American Indian/Alaska Native**			**Asian/Pacific Islander**			**Black**			**White**		
(yrs)	**No.**	**Rate**	**(95% CI)**	**No.**	**Rate**	**(95% CI)**	**No.**	**Rate**	**(95% CI)**	**No.**	**Rate**	**(95% CI)**
Women												
45–54	47	21.8	(16.0–29.0)	91	8.7	(7.0–10.6)	1,564	56.0	(53.2–58.8)	4,316	24.1	(23.4–24.8)
55–64	116	85.5	(69.9–101.0)	224	31.9	(27.7–36.1)	2,636	147.8	(142.1–153.4)	10,137	73.8	(72.3–75.2)
65–74	164	234.9	(199.0–270.9)	527	132.2	(120.9–143.5)	3,859	367.2	(355.6–378.8)	19,287	221.0	(217.9–224.1)
75–84	242	654.1	(571.7–736.5)	1,056	448.6	(421.5–475.7)	6,114	940.8	(917.3–964.4)	50,538	740.4	(733.9–746.8)
≥85	208	1,271.7	(1,098.9–1,444.5)	1,331	1,665.5	(1,576.0–1,754.9)	7,111	2,599.5	(2,539.1–2,660.0)	89,442	2,761.6	(2,743.6–2,779.7)
Total	**777**	**163.8**	**(152.3–175.3)**	**3,229**	**130.9**	**(126.3–135.4)**	**21,284**	**324.9**	**(320.6–329.3)**	**173,720**	**344.3**	**(342.6–345.9)**
Men												
45–54	164	81.0	(68.6–93.4)	374	39.9	(35.8–43.9)	3,140	130.9	(126.3–135.5)	15,294	86.2	(84.8–87.5)
55–64	241	191.7	(167.5–215.9)	690	114.0	(105.5–122.5)	4,890	340.1	(330.6–349.7)	27,772	212.7	(210.2–215.2)
65–74	256	424.4	(372.4–476.4)	858	261.7	(244.2–279.2)	5,300	704.9	(685.9–723.9)	36,434	483.8	(478.9–488.8)
75–84	248	900.6	(788.5–1,012.7)	1,191	736.4	(694.6–778.2)	5,384	1,456.9	(1,418.0–1,495.8)	60,452	1,275.5	(1,265.3–1,285.7)
≥85	113	1,441.7	(1,175.9–1,707.5)	1,045	2,169.9	(2,038.3–2,301.5)	2,973	2,656.7	(2,561.2–2,752.2)	51,632	3,396.0	(3,366.7–3,425.3)
Total	**1,022**	**241.1**	**(226.3–255.8)**	**4,158**	**199.8**	**(193.7–205.9)**	**21,687**	**427.8**	**(422.1–433.5)**	**191,584**	**429.6**	**(427.7–431.5)**

Abbreviation: CI = confidence interval.
*Per 100,000 U.S. standard population.

Columbia), with a median of 126.1 per 100,000 (North Carolina). Rates for the majority of the southern states were higher than the median, whereas all but one western state (California) had rates lower than the median. Stroke mortality rates ranged from 29.7 deaths per 100,000 population (New York) to 58.8 per 100,000 (Arkansas). The median stroke rate was 44.3 per 100,000 population (Wisconsin). As with CHD, stroke rates for the majority of southern states were higher than the median; however, all the northeastern states had stroke rates lower than the median. A comparison of CHD and stroke rates among the states demonstrated that high CHD mortality rates did not necessarily correspond with high stroke rates. Although New York and Rhode Island had the second and fifth highest CHD rates, respectively (New York, 181.2 deaths per 100,000 population; Rhode Island, 162.4 per 100,000), these states had the lowest stroke rates (New York, 29.7 per 100,000 population; Rhode Island, 31.4 per 100,000). However, certain southern states with high CHD rates also had high stroke rates (Arkansas, Oklahoma, and Tennessee).

The findings in this report are subject to at least four limitations. First, misclassification of race and ethnicity of the decedent on the death certificate might underestimate rates among AI/ANs, A/PIs, and Hispanics (*10*). Second, results from a study in New York City, New York, indicated that CHD is overreported as a cause of death on death certificates (*11*). However, these results might be specific to New York City. Third, the death rates reflect only the underlying cause of death and not other contributing causes of death such

TABLE 3. Number of deaths and age-specific death rates* for coronary heart disease among adults aged ≥45 years, by age group, sex, and Hispanic ethnicity — National Vital Statistics System, United States, 2006

Age group (yrs)	Women						Men					
	Hispanic			Non-Hispanic			Hispanic			Non-Hispanic		
	No.	Rate	(95% CI)	No.	Rate	(95% CI)	No.	Rate	(95% CI)	No.	Rate	(95% CI)
45–54	345	15.5	(13.8–17.1)	5,663	28.7	(27.9–29.4)	1,205	52.7	(49.7–55.7)	17,707	93.2	(91.8–94.6)
55–64	806	60.9	(56.7–65.1)	12,273	81.6	(80.2–83.0)	1,906	156.5	(149.5–163.6)	31,564	225.4	(222.9–227.8)
65–74	1,512	199.2	(189.2–209.2)	22,270	234.7	(231.6–237.8)	2,430	394.1	(378.5–409.8)	40,266	500.0	(495.1–504.9)
75–84	3,012	666.6	(642.8–690.4)	54,839	751.6	(745.3–757.9)	3,235	1,022.8	(987.6–1,058.1)	63,916	1,282.9	(1,273.0–1,292.9)
≥85	3,694	2,213.2	(2,141.8–2,284.5)	94,269	2,739.1	(2,721.6–2,756.6)	2,176	2,453.9	(2,350.8–2,557.0)	53,499	3,344.5	(3,316.2–3,372.9)
Total	**9,369**	**190.0**	**(186.2–193.9)**	**189,314**	**344.1**	**(342.5–345.6)**	**10,952**	**242.0**	**(237.5–246.5)**	**206,952**	**434.4**	**(432.5–436.2)**

Abbreviation: CI = confidence interval.
*Per 100,000 U.S. standard population.

TABLE 4. Number of deaths and age-specific death rates* for stroke among adults aged ≥45 years, by age group, sex, and race — National Vital Statistics System, United States, 2006

Age group (yrs)	Race											
	American Indian/Alaska Native			Asian/ Pacific Islander			Black			White		
	No.	Rate	(95% CI)	No.	Rate	(95% CI)	No.	Rate	(95% CI)	No.	Rate	(95% CI)
Women												
45–54	19	—[†]	—[†]	109	10.4	(8.4–12.3)	875	31.3	(29.3–33.4)	1,856	10.4	(9.9–10.8)
55–64	22	16.2	(10.2–24.5)	202	28.8	(24.8–32.7)	1,090	61.1	(57.5–64.7)	3,307	24.1	(23.2–24.9)
65–74	55	78.8	(59.4–102.5)	322	80.8	(72.0–89.6)	1,565	148.9	(141.5–156.3)	6,918	79.3	(77.4–81.1)
75–84	99	267.6	(217.5–325.8)	669	284.2	(262.7–305.7)	2,701	415.6	(400.0–431.3)	21,943	321.5	(317.2–325.7)
≥85	106	648.1	(524.7–771.5)	621	777.0	(715.9–838.2)	2,901	1,060.5	(1,021.9–1,099.1)	35,698	1,102.2	(1,090.8–1,113.7)
Total	**301**	**63.4**	**(56.3–70.6)**	**1,923**	**77.9**	**(74.5–81.4)**	**9,132**	**139.4**	**(136.5–142.3)**	**69,722**	**138.2**	**(137.1–139.2)**
Men												
45–54	33	16.3	(11.2–22.9)	126	13.4	(11.1–15.8)	1,044	43.5	(40.9–46.2)	2,279	12.8	(12.3–13.4)
55–64	44	35.0	(25.4–47.0)	220	36.3	(31.5–41.1)	1,523	105.9	(100.6–111.3)	4,110	31.5	(30.5–32.4)
65–74	50	82.9	(61.5–109.3)	357	108.9	(97.6–120.2)	1,644	218.7	(208.1–229.2)	7,312	97.1	(94.9–99.3)
75–84	48	174.3	(128.5–231.1)	477	294.9	(268.5–321.4)	1,741	471.1	(449.0–493.2)	16,041	338.5	(333.2–343.7)
≥85	27	344.5	(227.0–501.2)	417	865.9	(782.8–949.0)	987	882.0	(827.0–937.0)	14,311	941.3	(925.9–956.7)
Total	**202**	**47.6**	**(41.1–54.2)**	**1,597**	**76.7**	**(73.0–80.5)**	**6,939**	**136.9**	**(133.7–140.1)**	**44,053**	**98.8**	**(97.9–99.7)**

Abbreviation: CI = confidence interval.
* Per 100,000 U.S. standard population.
[†] Number of deaths too small to calculate a reliable rate.

TABLE 5. Number of deaths and age-specific death rates* for stroke among adults aged ≥45 years, by age group, sex, and Hispanic ethnicity — National Vital Statistics System, United States, 2006

Age group (yrs)	Women						Men					
	Hispanic			Non-Hispanic			Hispanic			Non-Hispanic		
	No.	Rate	(95% CI)	No.	Rate	(95% CI)	No.	Rate	(95% CI)	No.	Rate	(95% CI)
45–54	263	11.8	(10.4–13.2)	2,590	13.1	(12.6–13.6)	389	17.0	(15.3–18.7)	3,080	16.2	(15.6–16.8)
55–64	368	27.8	(25.0–30.7)	4,243	28.2	(27.4–29.1)	501	41.1	(37.5–44.8)	5,380	38.4	(37.4–39.4)
65–74	584	76.9	(70.7–83.2)	8,256	87.0	(85.1–88.9)	617	100.1	(92.2–108.0)	8,723	108.3	(106.0–110.6)
75–84	1,087	240.6	(226.3–254.9)	24,285	332.8	(328.6–337.0)	926	292.8	(273.9–311.6)	17,350	348.2	(343.1–353.4)
≥85	1,240	742.9	(701.6–784.3)	38,056	1,105.8	(1,094.6–1,116.9)	516	581.9	(531.7–632.1)	15,203	950.4	(935.3–965.5)
Total	**3,542**	**71.8**	**(69.5–74.2)**	**77,430**	**140.7**	**(139.7–141.7)**	**2,949**	**65.2**	**(62.8–67.5)**	**49,736**	**104.4**	**(103.5–105.3)**

Abbreviation: CI = confidence interval.
* Per 100,000 U.S. standard population.

as diabetes, which varies substantially across racial/ethnic groups. Finally, state of residence at death from CHD and stroke — diseases that often have long latency periods — might not reflect the location of the decedent's lifetime health, access to health care, and state cardiovascular health promotion activities.

The proposed *Healthy People 2020* objectives for heart disease and stroke were developed to prevent premature death from cardiovascular disease by maintaining low risk for disease, controlling increased risk, detecting and treating heart attacks and strokes, and reducing disability and recurrence (*12*). Research examining health

TABLE 6. Number of deaths and age-adjusted death rates* for coronary heart disease and stroke, by state/area — National Vital Statistics System, United States, 2006

	Coronary heart disease			Stroke		
State/Area†	**No.**	**Rate**	**(95% CI)**	**No.**	**Rate**	**(95% CI)**
District of Columbia	1,144	193.5	(182.2–204.8)	221	37.6	(32.6–42.6)
New York	39,385	181.2	(179.4–183.0)	6,398	29.7	(29.0–30.5)
Oklahoma	6,930	177.4	(173.2–181.6)	2,085	53.3	(51.0–55.6)
Tennessee	10,602	167.8	(164.6–171.0)	3,407	54.6	(52.8–56.5)
Rhode Island	2,187	162.4	(155.5–169.3)	421	31.4	(28.4–34.5)
Arkansas	5,100	160.1	(155.7–164.5)	1,884	58.8	(56.1–61.4)
West Virginia	3,548	158.7	(153.4–163.9)	1,072	47.6	(44.7–50.5)
Michigan	16,782	156.6	(154.2–158.9)	4,752	44.5	(43.3–45.8)
Missouri	10,206	155.2	(152.2–158.2)	3,247	49.4	(47.7–51.1)
Ohio	19,820	154.0	(151.8–156.1)	5,828	45.2	(44.1–46.4)
Kentucky	6,530	148.6	(145.0–152.2)	2,197	50.5	(48.3–52.6)
Mississippi	4,354	146.7	(142.4–151.1)	1,585	53.7	(51.1–56.4)
Maryland	7,744	141.7	(138.5–144.9)	2,365	43.6	(41.8–45.4)
Iowa	5,469	141.6	(137.7–145.4)	1,718	42.9	(40.8–45.0)
New Jersey	13,684	141.2	(138.8–143.6)	3,468	35.9	(34.7–37.1)
Delaware	1,305	140.8	(133.2–148.5)	384	41.8	(37.6–46.0)
South Dakota	1,397	140.0	(132.6–147.5)	442	42.4	(38.4–46.4)
Indiana	9,210	139.7	(136.8–142.5)	3,238	49.1	(47.4–50.8)
California	46,584	139.0	(137.7–140.2)	15,039	44.9	(44.2–45.6)
Louisiana	5,919	138.3	(134.7–141.8)	2,195	52.1	(49.9–54.3)
Pennsylvania	22,030	136.0	(134.2–137.8)	7,151	43.6	(42.6–44.6)
Illinois	17,747	134.8	(132.8–136.8)	5,989	45.4	(44.3–46.6)
North Dakota	1,115	133.7	(125.7–141.8)	428	49.2	(44.5–54.0)
Texas	25,933	132.2	(130.6–133.8)	9,366	48.3	(47.3–49.3)
Florida	32,868	129.2	(127.8–130.6)	8,925	35.3	(34.5–36.0)
North Carolina	11,173	126.1	(123.8–128.5)	4,572	52.4	(50.9–53.9)
Vermont	880	124.5	(116.2–132.8)	264	37.8	(33.2–42.4)
Alabama	6,038	121.7	(118.6–124.8)	2,740	55.5	(53.4–57.6)
Arizona	7,806	120.8	(118.1–123.5)	2,226	34.5	(33.1–36.0)
Nevada	2,649	119.5	(114.9–124.1)	847	39.7	(37.0–42.4)
South Carolina	5,398	119.2	(116.0–122.4)	2,291	51.6	(49.5–53.8)
New Hampshire	1,629	116.3	(110.6–121.9)	494	35.4	(32.3–38.6)
Virginia	8,486	115.6	(113.1–118.0)	3,523	49.0	(47.3–50.6)
Washington	7,303	114.7	(112.1–117.4)	2,725	42.9	(41.3–44.6)
New Mexico	2,277	114.6	(109.9–119.3)	739	37.5	(34.8–40.2)
Kansas	3,565	114.1	(110.3–117.8)	1,489	46.7	(44.3–49.1)
Wisconsin	7,183	113.9	(111.3–116.6)	2,829	44.3	(42.7–46.0)
Maine	1,816	112.2	(107.0–117.4)	670	41.3	(38.2–44.5)
Idaho	1,565	110.2	(104.7–115.7)	725	51.6	(47.9–55.4)
Connecticut	4,630	110.0	(106.8–113.2)	1,547	36.5	(34.6–38.3)
Georgia	8,371	108.7	(106.4–111.1)	3,889	51.4	(49.8–53.1)
Wyoming	561	107.1	(98.2–116.1)	236	45.4	(39.6–51.3)
Massachusetts	8,015	105.6	(103.3–108.0)	2,880	37.7	(36.3–39.0)
Oregon	4,070	99.2	(96.1–102.3)	1,978	48.0	(45.9–50.1)
Montana	1,093	99.0	(93.0–104.9)	461	41.2	(37.4–44.9)
Colorado	3,922	96.3	(93.2–99.3)	1,532	38.7	(36.7–40.6)
Nebraska	1,861	89.9	(85.8–94.0)	922	43.9	(41.0–46.7)
Alaska	351	87.4	(77.7–97.2)	177	46.8	(39.5–54.1)
Hawaii	1,298	85.2	(80.5–89.9)	665	43.2	(39.9–46.5)
Minnesota	4,430	79.7	(77.3–82.0)	2,219	39.3	(37.7–41.0)
Utah	1,462	77.5	(73.5–81.5)	674	36.2	(33.5–38.9)

Abbreviation: CI = confidence interval.
* Per 100,000 U.S. standard population.
† In order of coronary heart disease rank, from highest to lowest rate.

disparities in heart disease and stroke among persons who already have heart disease or have experienced a stroke often focuses on differences in access to care (*13–16*), use of diagnostic and surgical procedures (*17–20*), and type of medication used in treatment (*21,22*). Research examining the promotion of cardiovascular health through preventing onset of hypertension and atherosclerosis should be given priority because major disparities exist in the prevalence of cardiovascular risk factors among population groups at early ages (*23–25*). However, insufficient research has been conducted regarding behaviors that maintain low risk and prevent the initiation and progression of hypertension and atherosclerosis. Although there are no community guides for cardiovascular disease as a whole or heart disease, stroke, hypertension, or cholesterol in particular, the *Guide to Community Preventive Services* topic areas include diabetes, nutrition, physical activity, tobacco, and obesity (*26*). Promoting community guidelines for interventions based on systematic reviews of interventions in each of these topic areas will improve cardiovascular health and reduce deaths from heart disease and stroke. In addition to related community guides, the national clinical guidelines for cholesterol, hypertension and obesity are being updated and are expected to be released in fall 2011 (*27*).

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Homicides — United States, 1999–2007

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During 1991–2007, homicide was ranked as one of the top four leading causes of death each year for persons aged 1–40 years living in the United States (*1*). Furthermore, vast disparities in homicide rates have been reported between males and females and among different age and racial/ethnic groups (*2–6*). For example, previous studies have indicated that rates of death from homicide are particularly high among males (*4–6*), persons aged 15–34 years and <1 year (*5*), and blacks (*2,3,5,6*). Homicide rates for males are estimated to be approximately 3–4 times higher than that for females (*4,5*); among persons aged 20–24 years, the male homicide rate is 6 times higher than that for females (*1,5*). In addition, minority racial/ethnic children and young adults in the United States are disproportionately affected by homicide. During 1999–2002, among persons aged 10–19 years, the homicide rate for blacks was estimated to be 17.8 per 100,000 population, a rate 10 times that of whites (1.8 per 100,000) and higher than the rates reported for American Indians/Alaska Natives (AI/ANs) (6.0 per 100,000), Asian/Pacific Islanders (A/PIs) (2.9 per 100,000), and Hispanics (8.0 per 100,000) (*2*).

To assess homicide rates in the United States by sex, age, and race/ethnicity for 2007, CDC assessed data from the CDC Web-based Injury Statistics Query and Reporting System — Fatal (WISQARS Fatal) (*1*). This report summarizes these rates, identifies specific population groups with the highest rates of death from homicide, and provides homicide rates by race/ethnicity and year throughout a 9-year period (1999–2007). Additional details on homicide rates by these variables for each state and census region can be accessed through the WISQARS Fatal online query system (http://www.cdc.gov/injury/wisqars/index.html). Data on individual and socioeconomic risk factors for homicide were unavailable for analysis. In addition, sufficient data were unavailable to assess disparities by certain racial/ethnic subgroups, family income, educational attainment, disability status, and sexual orientation.

WISQARS Fatal provides injury mortality data by cause (e.g., firearm, poisoning, or suffocation) and manner of death (e.g., suicide, homicide, or unintentional injury) (*1*). Mortality data originate from the CDC National Vital Statistics System (NVSS). NVSS collects death certificate data filed in the 50 states and the District of Columbia (*7*). Data in this report were based on homicides caused by any mechanism.

NVSS codes racial categories as white, black, AI/AN, and A/PI, and ethnicity is coded separately as Hispanic or non-Hispanic (7). All references to a specific race refer to non-Hispanic members (e.g., white non-Hispanic and black non-Hispanic).

Unadjusted and age-adjusted homicide rates per 100,000 population were calculated based on annual death counts and the 2000 U.S. standard population data from the U.S. Census Bureau (*1*). Confidence intervals (CIs) of rates were calculated in two ways: groupings of annual death counts of <100 were calculated by using a gamma estimation method (*7*), and groupings of annual death counts of ≥100 were calculated by using a normal approximation approach. Differences in two rates, when either rate was calculated from <100 deaths, were determined by comparing 95% CIs. Nonoverlapping CIs were considered statistically significant at the 0.05 level. However, this method is a conservative test for statistical significance, and the difference between two rates might be statistically significant even though their CIs overlap. Differences in two rates of >100 deaths, for which a normal approximation was appropriate, were tested by calculating a z test statistic (*7*), with an alpha level for significance of 0.05. Because the coding of the mortality data changed to the *International Classification of Diseases, Tenth Revision* (ICD-10) beginning in 1999, analyses by year and race/ethnicity were conducted for 1999–2007 to examine rate changes during that period. To compare differences in rates across the years 1999–2007, trend analyses were conducted using a negative binomial rate regression model (*8*).

During 2007, homicide rates were highest among persons aged 15–34 years, and the overall unadjusted rate for males was approximately 4 times that of females (9.8 versus 2.5 deaths per 100,000 population, respectively) (Table 1). Unadjusted homicide rates were highest among blacks (23.1 deaths per 100,000), followed by AI/ANs (7.8) and Hispanics (7.6), then whites (2.7) and A/PIs (2.4) (Table 1).

Additional analyses by age, race/ethnicity, and sex revealed that black males aged 15–34 years were at greatest risk for death by homicide (Table 2). Based on the available data, black females also had the highest homicide rates compared with females in other racial/ethnic groups within each age category, with the exception of women aged 30–49 years (Table 2). Within this age group, a statistical difference between the rates of black and AI/AN women could not be determined. Both rates were significantly higher than those of white, Hispanic, and A/PI women. (All comparisons were significant at the $p<0.05$ level.)

During the 9-year study period, trend analyses revealed that the age-adjusted homicide rates increased for blacks and decreased for Hispanics and A/PIs ($p<0.05$) (Figure). Furthermore, trend analyses revealed that the between-group differences in the modeled age-adjusted homicide rates for blacks versus AI/ANs, blacks versus A/PIs, and blacks versus Hispanics increased over the 9-year period

TABLE 1. Homicide rates,* by sex — National Vital Statistics System, United States, 2007

	Male			Female			Total		
Characteristic	**No. of deaths**	**Rate**	**(95% CI[†])**	**No. of deaths**	**Rate**	**(95% CI)**	**No. of deaths**	**Rate**	**(95% CI)**
Age group (yrs)									
0–4	419	4.0	(3.6–4.3)	331	3.3	(2.9–3.6)	**750**	**3.6**	**(3.4–3.9)**
5–9	66	0.7	(0.5–0.8)	67	0.7	(0.5–0.9)	**133**	**0.7**	**(0.6–0.8)**
10–14	144	1.4	(1.2–1.6)	69	0.7	(0.5–0.9)	**213**	**1.0**	**(0.9–1.2)**
15–19	1,932	17.6	(16.8–18.4)	292	2.8	(2.5–3.1)	**2,224**	**10.4**	**(9.9–10.8)**
20–24	2,897	26.8	(25.8–27.8)	430	4.2	(3.8–4.6)	**3,327**	**15.9**	**(15.3–16.4)**
25–29	2,306	21.5	(20.6–22.4)	411	4.0	(3.6–4.4)	**2,717**	**13.0**	**(12.5–13.5)**
30–34	1,713	17.4	(16.6–18.2)	328	3.4	(3.1–3.8)	**2,041**	**10.5**	**(10.0–11.0)**
35–39	1,254	11.8	(11.1–12.5)	365	3.5	(3.1–3.8)	**1,619**	**7.7**	**(7.3–8.0)**
40–44	1,035	9.5	(8.9–10.0)	398	3.6	(3.3–4.0)	**1,433**	**6.5**	**(6.2–6.9)**
45–49	881	7.8	(7.3–8.3)	353	3.1	(2.7–3.4)	**1,234**	**5.4**	**(5.1–5.7)**
50–54	691	6.7	(6.2–7.2)	215	2.0	(1.7–2.3)	**906**	**4.3**	**(4.0–4.6)**
55–59	453	5.1	(4.6–5.6)	146	1.6	(1.3–1.8)	**599**	**3.3**	**(3.0–3.5)**
60–64	274	4.0	(3.5–4.4)	107	1.4	(1.1–1.7)	**381**	**2.6**	**(2.4–2.9)**
65–69	165	3.3	(2.8–3.8)	75	1.3	(1.0–1.6)	**240**	**2.2**	**(1.9–2.5)**
70–74	114	2.9	(2.4–3.5)	57	1.2	(0.9–1.6)	**171**	**2.0**	**(1.7–2.3)**
75–79	94	3.0	(2.4–3.7)	52	1.2	(0.9–1.6)	**146**	**2.0**	**(1.7–2.3)**
80–84	55	2.5	(1.9–3.2)	67	1.9	(1.5–2.4)	**122**	**2.1**	**(1.8–2.5)**
≥85	26	1.5	(1.0–2.1)	54	1.4	(1.1–1.9)	**80**	**1.5**	**(1.2–1.8)**
Race/Ethnicity									
White, non-Hispanic	3,669	3.7	(3.6–3.8)	1,843	1.8	(1.7–1.9)	**5,512**	**2.7**	**(2.7–2.8)**
Black, non-Hispanic	7,477	41.4	(40.4–42.3)	1,269	6.4	(6.0–6.8)	**8,746**	**23.1**	**(22.6–23.6)**
American Indian/Alaska Native	147	11.8	(9.9–13.6)	52	4.0	(3.0–5.3)	**199**	**7.8**	**(6.7–8.9)**
Asian/Pacific Islander	236	3.4	(3.0–3.9)	105	1.5	(1.2–1.7)	**341**	**2.4**	**(2.2–2.7)**
Hispanic	2,926	12.5	(12.0–12.9)	540	2.5	(2.2–2.7)	**3,466**	**7.6**	**(7.4–7.9)**
Total[§]	**14,538**	**9.8**	**(9.6–10.0)**	**3,823**	**2.5**	**(2.4–2.6)**	**18,361**	**6.1**	**(6.0–6.2)**

Abbreviation: CI = confidence interval.

Source: Xu J, Kockanek KD, Murphy SL, Tejada-Vera B. Deaths: final data for 2007. Hyattsville, MD: US Department of Health and Human Services, CDC, National Center for Health Statistics; 2010. National Vital Statistics Report Vol. 58, No. 19. Available at http://www.cdc.gov/NCHS/data/nvsr/nvsr58/nvsr58_19.pdf.

[*] Per 100,000 population.

[†] CIs based on <100 deaths were calculated by using a gamma method; CIs based on ≥100 deaths were calculated by using a normal approximation.

[§] Total counts include 97 deaths among persons of unknown ethnicity and 25 deaths among persons of unknown age.

($p<0.05$). However, these changes were slight and likely detected because large populations were analyzed. Age-adjusted homicide rates were consistently highest among blacks, ranging from 20.6 to 22.4 deaths per 100,000 persons (Figure). Each year, the rate among blacks was approximately 2–3 times higher than among AI/ANs and Hispanics and at least 5 times higher than A/PIs and whites.

Similar to previous findings, results of this study indicate that homicide disparities by age, race/ethnicity, and sex are evident (*2,3,5*), and the homicide rate is particularly high among young black males (*2,3*). Individual factors (e.g., employment status) and socioeconomic factors (e.g., poverty and economic inequality) play critical roles in racial/ethnic disparities in homicide (*9*). For example, persons of a minority race are more likely than those of other racial/ethnic backgrounds to be unemployed and to live in economically impoverished residential areas; both factors are associated with a higher homicide risk (*9*).

Among females, blacks had higher homicide rates than other racial/ethnic groups; however, AI/AN women aged 30–49 years also had high rates. These findings indicate heightened risk for females during adulthood, which might be indicative of intimate

TABLE 2. Homicide rates,* by race/ethnicity — National Vital Statistics System, United States, 2007

	White, non-Hispanic		Black, non-Hispanic		American Indian/ Alaska Native		Asian/Pacific Islander		Hispanic	
Age group (yrs)	**Rate**	**(95% CI†)**	**Rate**	**(95% CI)**	**Rate**	**(95% CI)**	**Rate**	**(95% CI)**	**Rate**	**(95% CI)**
Male										
0–4	3.0	2.5–3.4	10.1	8.5–1.7	—§	—	—	—	2.8	2.2–3.6
5–9	0.6	0.4–0.8	1.4	0.9–2.1	—	—	—	—	—	—
10–14	0.4	0.2–0.5	4.6	3.6–5.8	—	—	—	—	1.9	1.4–2.6
15–19	3.4	3.0–3.8	69.1	65.1–73.0	—	—	5.2	3.3–7.7	24.8	22.5–27.0
20–24	6.3	5.7–6.9	109.4	104.2–114.6	22.9	15.0–33.5	8.8	6.3–11.8	35.9	33.2–38.5
25–29	6.4	5.8–7.0	94.6	89.5–99.7	26.6	17.3–38.9	4.6	3.0–6.81	22.3	20.4–24.2
30–34	6.0	5.4–6.6	76.5	71.6–81.5	24.3	14.8–37.5	4.6	3.1–6.6	18.1	16.3–19.9
35–39	5.0	4.5–5.6	50.7	46.7–54.6	—	—	3.8	2.41–5.6	12.2	10.7–13.8
40–49	4.8	4.4–5.1	31.8	29.6–34.0	14.4	9.3–21.3	3.0	2.1–4.3	9.8	8.7–10.9
50–59	3.7	3.4–4.1	22.2	20.1–24.3	—	—	3.1	2.0–4.6	7.2	6.0–8.5
60–69	2.4	2.1–2.7	14.5	12.2–16.9	—	—	—	—	4.4	3.2–6.0
≥70	2.0	1.7–2.2	10.0	7.9–12.4	—	—	—	—	3.7	2.4–5.4
Total	**3.7**	**3.6–3.8**	**41.4**	**40.4–42.3**	**11.7**	**9.9–13.6**	**3.4**	**3.0–3.9**	**12.5**	**12.0–12.9**
Female										
0–9	1.4	1.2–1.7	4.3	3.6–5.1	—	—	—	—	2.1	1.7–2.6
10–19	1.1	1.0–1.3	4.5	3.8–5.3	—	—	—	—	1.7	1.3–2.2
20–29	2.6	2.3–2.8	11.3	10.1–12.6	—	—	2.1	1.3–3.2	4.1	3.4–4.8
30–49	2.5	2.3–2.7	8.8	8.0–9.5	6.8	4.4–10.2	1.8	1.3–2.4	2.9	2.5–3.3
50–69	1.4	1.3–1.5	3.3	2.8–3.9	—	—	1.6	1.0–2.4	1.4	1.0–1.9
≥70	1.3	1.1–1.5	2.9	2.1–3.9	—	—	—	—	—	—
Total	**1.8**	**1.7–1.9**	**6.4**	**6.0–6.8**	**4.0**	**3.0–5.3**	**1.4**	**1.2–1.7**	**2.5**	**2.2–2.7**

Abbreviation: CI = confidence interval.

Source: Xu J, Kockanek KD, Murphy SL, Tejada-Vera B. Deaths: final data for 2007. Hyattsville, MD: US Department of Health and Human Services, CDC, National Center for Health Statistics; 2010. National Vital Statistics Report Vol. 58, No. 19. Available at http://www.cdc.gov/NCHS/data/nvsr/nvsr58/nvsr58_19.pdf.

[*] Per 100,000 population.

[†] CIs based on <100 deaths are calculated by using a gamma method; CIs based on ≥100 deaths are calculated by using a normal approximation.

[§] Rates unreliable (calculated from <20 deaths).

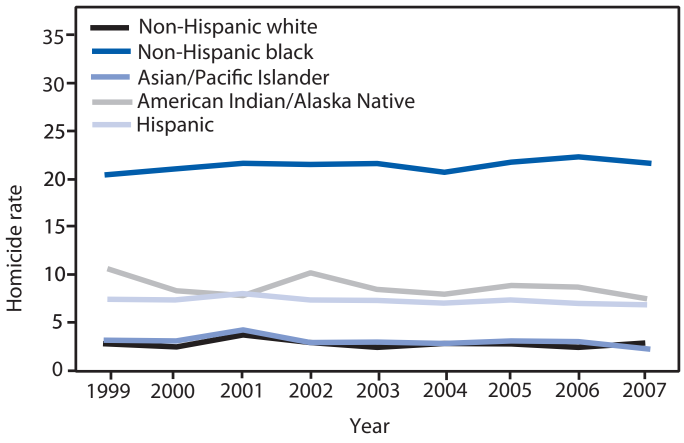
partner–related homicide. These findings also are consistent with a study that reported high rates of intimate partner-related homicide among black women aged 20–39 years (*10*) and another study that estimated that one third (30.7%) of AI/AN women aged ≥18 years had been physically assaulted by an intimate partner in their lifetime (*11*).

Although the 1999–2007 homicide rates were highest among blacks, their rate for 2007 represents a substantial decrease compared with the early 1990s. In 1991, the homicide rate among non-Hispanic blacks peaked at 38 deaths per 100,000 population (*1*), which was nearly twice the rate reported in 2007. Similar decreases from the early 1990s to the mid-2000s were observed among the other racial/ethnic minorities (*1*).

The findings in this report are subject to at least two limitations. First, because the numbers of homicides among AI/AN and A/PI populations were limited, some rates could not be estimated reliably by age and sex. Second, death certificate data have historically underclassified decedents as AI/AN, A/PI, or Hispanic and overclassified decedents as black or white (*2,12*). Therefore, homicide rates in this report might be underestimates for the AI/AN, A/PI, and Hispanic populations and overestimates for the black and white populations.

Homicide is an extreme outcome of the broader public health problem of interpersonal violence. Despite the promising decrease in certain homicide rates, primary prevention efforts against violence should be increased, particularly among young racial/ethnic minority males. Effective evidence-based strategies are available to reduce youth violence (*13*). For example, universal school-based interventions, at all school levels, that are aimed at reducing youth violence are promising. Such interventions teach students the skills to reduce

FIGURE. Age-adjusted homicide rates,* by race/ethnicity and year — National Vital Statistics System, United States, 1999–2007



*Per 100,000 population.

violent and aggressive behavior, as well improve emotional well being, self-esteem, positive social skills, social problem-solving skills, conflict resolution skills, and team work (*14*). However, additional work is needed to build organizational and community capacity to use effective approaches, and research is needed to understand how best to adapt, disseminate, and implement these strategies within the communities and populations in greatest need. Furthermore, more investigation is needed to identify the factors that cause homicide disparities by age, sex, and race/ethnicity so that prevention efforts can better address the needs of those at highest risk.

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Health Outcomes

Morbidity

Obesity — United States, 1988–2008

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The prevalence of obesity in the United States has increased substantially since the 1960s (*1*). From 1976–1980 to 2007–2008, obesity prevalence increased from 15% to 34% among adults and from 5% to 17% among children and adolescents (*2,3*). Substantial differences exist in obesity prevalence among racial/ethnic groups, and these differences vary by sex and age group.

To assess differences and trends over time in obesity prevalence and to determine whether these disparities can be attributed to differences in family income, CDC analyzed data from the National Health and Nutrition Examination Survey (NHANES) III (1988–1994) and data collected in NHANES between 1999 and 2008. In 1999, NHANES became a continuous survey, with data releases at 2-year intervals; 2007–2008 is the most recent release for which data were available (*4*). NHANES samples are selected by using a stratified, multistage cluster design and are representative of the U.S. civilian noninstitutionalized population. CDC examined disparities in obesity prevalence by sex, age, time period, and family income. Disparities were not assessed by education level; disability status; lesbian, gay, bisexual, or transgender status; or geographic region.

Weight and height were measured by using standardized techniques and equipment, and body mass index (BMI) was calculated as kilograms per square meter (kg/m^2). Adults aged ≥20 years with BMI ≥ 30.0 kg/m^2 obesity were categorized as obese (*5*). Children aged 2–19 years with BMI-for-age ≥ 95th percentile of the CDC growth charts (*6*) or BMI ≥ 30.0 kg/m^2 were categorized as obese. It is possible for persons aged 18–19 years to have a BMI ≥ 30 kg/m^2 (the adult definition of obesity) but to have a BMI-for-age that is less than the CDC 95th percentile. Pregnant women (n = 1,661, approximately 2% of the sample) were excluded from analysis. Data regarding race/ethnicity were self-reported for persons aged ≥16 years or reported by a family member (for persons aged ≤15 years) after being provided a list that included an open-ended response. The analyses described in this report include non-Hispanic whites, non-Hispanic blacks, and Mexican Americans. Because of insufficient numbers, other racial/ethnic groups (including Hispanics who were not Mexican American) were excluded.

During each household interview, respondents were asked to report the total annual income for themselves and for other family members. This information was divided by the poverty threshold for the specific family size to yield the poverty to income ratio (PIR), an indicator of socioeconomic status. The 2009 poverty threshold for a family of four was $22,050 (*7*); therefore, a PIR of 2.0 indicates that the total income for this family was $44,100. CDC recoded PIR values of >5 as 5.0.

Data from NHANES III for 10,275 persons aged 2–19 years and 16,037 persons aged ≥20 years were analyzed. The number of persons aged 2–19 years in each of the five 2-year cycles (beginning in 1999–2000) ranged from 2,677 to 3,888, and the number of persons aged ≥20 years ranged from 3,746 to 4,707. Because blacks and Mexican Americans were oversampled, 29% of the persons in the sample used for this report were black, and 30% were Mexican American. Analyses used the sampling weights and accounted for the complex sampling design. The statistical significance ($p<0.05$) of the association between the PIR and the prevalence of obesity was assessed in logistic regression models that included both PIR and age as continuous variables. These analyses were restricted to the 15,277 persons examined in 2005–2008. Approximately 6% (n = 971) of these persons did not have information on family income and were excluded from the analyses of PIR.

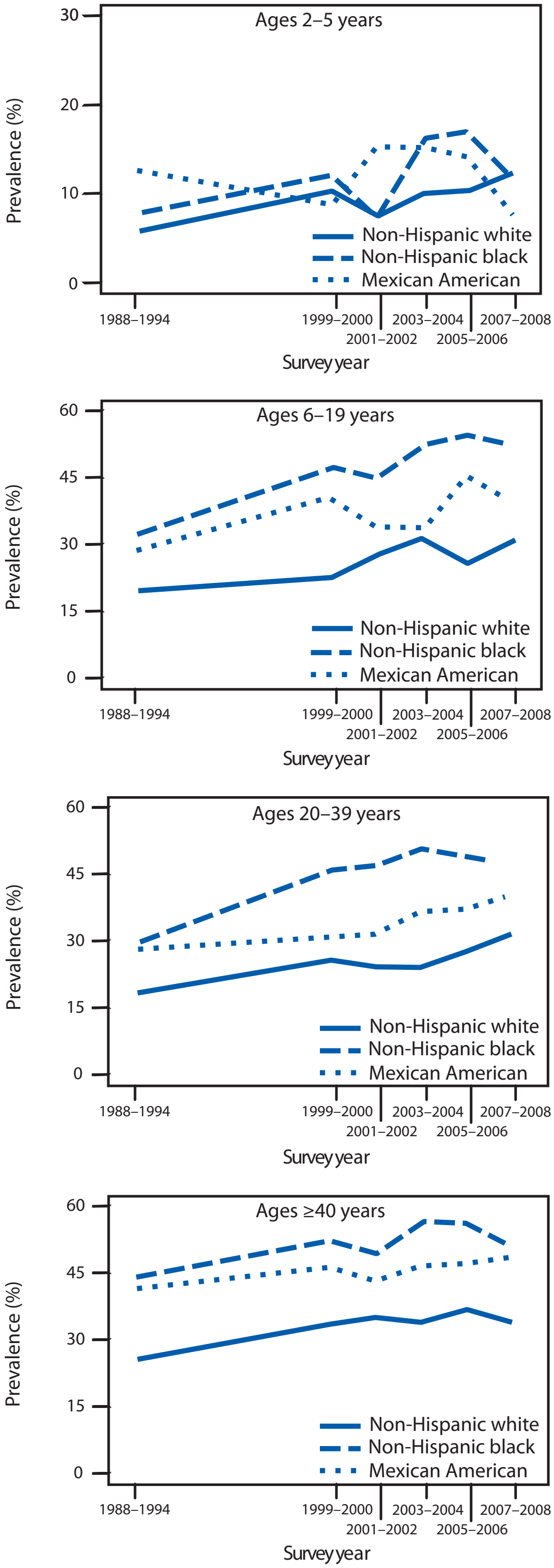
Racial/ethnic differences occurred among respondents in the six NHANES for 1988–1994 and 1999–2008 (Figures 1 and 2). Although variability exists in the estimated obesity prevalences in each survey, the racial/ethnic differences have not changed substantially throughout this period. No consistent racial/ethnic differences occurred in obesity prevalence among females aged 2–5 years. However, among females aged >5 years, blacks had the highest prevalence in each of the six surveys, followed by Mexican Americans and whites (who had the lowest prevalence) (Figure 1).

Racial/ethnic differences in obesity prevalence also were observed among males aged 2–40 years (Figure 2), although the trends among older men were less consistent. Among males aged 2–19 years, Mexican Americans had a higher prevalence of obesity than whites or blacks in almost all surveys. However, limited or inconsistent differences were observed in the majority of surveys between white and black males aged 2–19 years. Among men aged 20–39 years, obesity prevalence was lower among white men than among either Mexican-American men or black men, although the patterns were somewhat inconsistent. Among men aged ≥40 years, no consistent racial/ethnic differences were observed.

Data are displayed within narrower age groupings for the most recent 4 years (2005–2008) of NHANES (Table 1). Substantial racial/ethnic disparities occurred in obesity prevalence. With the exception of men aged ≥20 years, whites had a lower prevalence of obesity than did blacks and Mexican Americans.

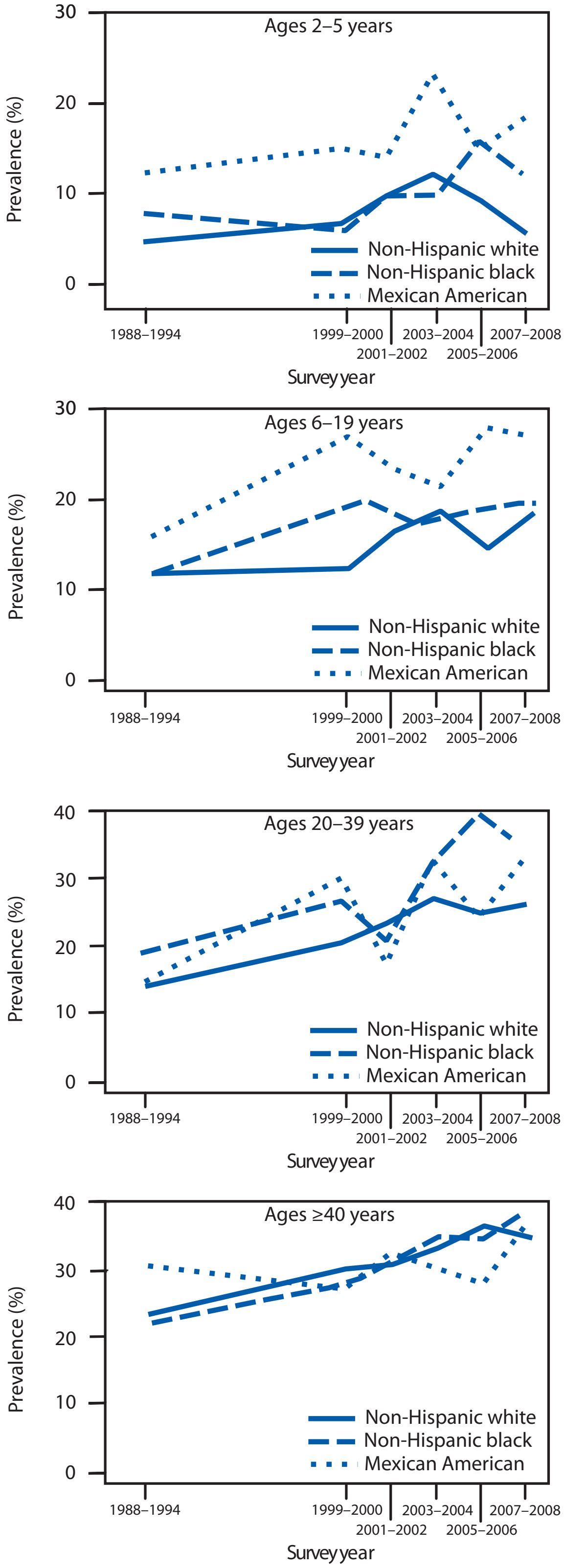
Among females aged 2–19 years, obesity prevalence was 24% among blacks, followed by 19% among Mexican Americans and 14% among whites. A somewhat similar pattern was observed among women aged ≥20 years, with black women having a substantially higher prevalence of obesity (51%) than Mexican-American women (43%) and white women (33%). Among males aged 2–19 years, Mexican Americans had the highest prevalence of obesity (25%), with similar prevalences observed among whites (15%) and blacks (18%). The higher prevalence of obesity among black men aged ≥20 years (37%) than among whites (32%) and Mexican

FIGURE 1. Prevalence of obesity among females, by age group and race/ethnicity — National Health and Nutrition Examination Survey (NHANES), United States, 1988–1994, 1999–2008*



* Based on data collected during 1988–1994 and in 2-year cycles from 1999–2000 to 2007–2008.

FIGURE 2. Prevalence of obesity among males, by age group and race/ethnicity — National Health and Nutrition Examination Survey (NHANES), United States, 1988–1994, 1999–2008*



* Based on data collected during 1988–1994 and in 2-year cycles from 1999–2000 to 2007–2008.

TABLE 1. Prevalence of obesity, by age and race/ethnicity — National Health and Nutrition Examination Survey, United States, 2005–2008*

		Race/Ethnicity					
		White, non-Hispanic		Black, non-Hispanic		Mexican American	
Sex	Age group (yrs)	Prevalence, %	(SE)	Prevalence, %	(SE)	Prevalence, %	(SE)
Female	2–19	14	(2)	24	(2)	19	(1)
	≥20	33	(1)	51	(1)	43	(2)
	2–5	11	(2)	14	(3)	11	(2)
	6–11	15	(2)	21	(3)	21	(2)
	12–19	14	(2)	31	(2)	22	(2)
	20–39	29	(3)	47	(2)	38	(2)
	40–59	37	(2)	52	(2)	49	(4)
	≥60	32	(2)	55	(3)	43	(3)
Male	2–19	15	(1)	18	(1)	25	(2)
	≥20	32	(1)	37	(2)	31	(3)
	2–5	7	(2)	14	(2)	17	(2)
	6–11	17	(2)	19	(3)	29	(3)
	12–19	16	(2)	19	(2)	26	(2)
	20–39	26	(2)	37	(2)	29	(3)
	40–59	36	(2)	37	(3)	33	(4)
	≥60	35	(1)	37	(2)	33	(4)
Total	**2–19**	**14**	**(1)**	**21**	**(1)**	**22**	**(1)**
	≥20	**33**	**(1)**	**44**	**(1)**	**36**	**(2)**

Abbreviation: SE = standard error.
* N = 15,277.

Americans (31%) is largely attributable to the differences among younger (aged 20–39 years) men. There was little difference in the prevalence of obesity across racial/ethnic groups among older (aged ≥40 years) men.

Differences in obesity prevalence persisted within various categories of family income (Table 2). Black females had a higher prevalence of obesity within most income categories than did white or Mexican-American females. Furthermore, Mexican-American males aged 2–19 years had a higher prevalence of obesity than whites or blacks within each category of family income.

Although family income was inversely associated with obesity prevalence among white females of all ages and white males aged 2–19 years ($p<0.05$ for linear trend), the associations were not statistically significant among white men and the majority of sex-age categories of blacks and Mexican Americans. Furthermore, a positive association existed between family income and obesity prevalence among black men aged ≥20 years ($p<0.05$). The prevalence of obesity increased from 29% (PIR < 1.3) to 45% (PIR ≥ 3.5) across the three categories of family income.

The racial/ethnic differences in obesity prevalence did not vary substantially between 1988–1994 and 2007–2008. However, considerable changes occurred over longer periods among persons aged <20 years. For example, an analysis of data collected during 1971–1974 (NHANES I) and NHANES 1999–2000 (*8*) indicated that among girls aged 6–17 years, the increases in obesity prevalence were greater among blacks than whites during this period. In contrast with the higher prevalence of obesity observed among black women aged 2–19 years (24%) compared with white women aged 2–19 years (14%) during 2005–2008 (Table 1), the prevalence of obesity did not differ between black and white girls aged 2–17 years during the early 1970s (*8*). From 1971–1974 to 1999–2000, the mean weight of black adolescent girls (aged 12–16 years) increased by approximately 11 kg (24 lbs), whereas the increase among white girls of the same age was 4 kg (9 lbs) (*8*).

Although racial/ethnic differences in obesity among persons aged ≥20 years also have increased over time, the magnitude of these increases has been less than among persons aged 2–19 years. For example, the mean BMI of black women aged ≥20 years was 2.4 kg/m^2 greater than that of white women during 1960–1962 (*9*), and this difference increased to 3.4 kg/m^2 during 2005–2008. Furthermore, 24% of white women and 42% of black women had a BMI ≥27.3 kg/m^2 during 1960–1962 (*9*), whereas the comparable prevalences were 46% (white women) and 66% (black women) during 2005–2008.

Recent increases in obesity likely result from the interaction of biologic, social, and cultural factors with an environment characterized by limited opportunities for physical activity and an abundance of high-calorie foods (*10,11*). For example, during the 1980s and 1990s, substantial increases occurred in the availability of processed foods and in the number of meals eaten away from home (*12*). Neighborhoods with large minority populations have fewer chain supermarkets and produce stores, increasing the difficulty and expense in obtaining healthy foods (*13*). In addition, breastfeeding, which is inversely associated with childhood obesity, is more prevalent among white women than among black women (*14*). Furthermore, compared with whites, blacks and Mexican Americans are less likely to engage in regular (nonoccupational) physical activity (*15*). Differences also exist in attitudes and cultural norms concerning body weight. For example, black and Hispanic women have been reported to be more satisfied with their body size and therefore less likely to try to lose weight than white women (*16*). Additional cultural factors, such as equating overweight with healthiness in children or the use of food treats by parents as tokens of love and caring, might influence childhood obesity among Mexican Americans (*17*).

The results of this study are subject to at least two limitations. First, NHANES data do not include an adequate number of persons who are minorities (other than black and Mexican American) to estimate obesity prevalence; other studies (*18*) have reported high prevalences among American Indians/Alaska Natives. Second, the NHANES racial/ethnic categories differed somewhat between surveys conducted during 1988–1994 and 1999–2008, with the latter surveys including a multiracial category. On the basis of data from the three NHANES (1999–2000, 2001–2002, and 2003–2004) that included both racial/ethnic classifications, approximately 1% of white persons and 2% of black persons in 1988–1994 would have been classified into the category of other race, which included

TABLE 2. Prevalence of obesity, by sex and PIR — National Health and Nutrition Examination Survey, United States, 2005–2008*

Characteristic		Race/Ethnicity											
		Female						Male					
		White, non-Hispanic		Black, non-Hispanic		Mexican American		White, non-Hispanic		Black, non-Hispanic		Mexican American	
Age (yrs)	PIR[†]	Prevalence, %	(SE)	Prevalence, %	(SE)	Prevalence, %	(SE)	Prevalence, %	(SE)	Prevalence, %	(SE)	Prevalence, %	(SE)
2–19	<1.30	18	(3)	26	(3)	17	(2)	21	(2)	18	(2)	24	(2)
	1.30–3.49	15	(3)	21	(3)	22	(3)	16	(3)	20	(2)	26	(3)
	≥3.50	11[§]	(2)	23	(4)	20	(4)	10[§]	(2)	12	(3)	23	(3)
≥20	<1.30	39	(2)	53	(3)	44	(4)	30	(3)	29	(3)	29	(2)
	1.30–3.49	36	(2)	51	(2)	45	(3)	34	(3)	35	(2)	30	(4)
	≥3.50	29[§]	(2)	48	(4)	35	(4)	33	(2)	45[§]	(3)	38[¶]	(5)

Abbreviations: SE = standard error; PIR = poverty to income ratio.

[*] N = 14,306 persons with data for PIR.

[†] For a family of four, the poverty threshold was $22,050 in 2009. Therefore, for a family of four, a PIR of 1.3 represented an income of $28,665, and a PIR of 3.5 represented an income of $77,175.

[§] $p<0.05$ for linear association between PIR and prevalence of obesity within specified sex, race/ethnicity, and age group. Statistical significance was assessed in logistic regression models that included PIR and age as continuous variables.

[¶] Based on models that treated PIR as a continuous variable, the association between family income and obesity was not statistially significant ($p = 0.07$) among Mexican-American men aged ≥20 yrs. However, models that contrasted the prevalence of obesity across the three PIR catgeories indicated that the prevalence was significantly higher ($p = 0.04$) among Mexican-American men with a PIR ≥ 3.5 than among those with a PIR < 1.3.

multirace. However, this limited amount of reclassification likely did not influence substantially the results in this report.

Substantial differences exist in obesity prevalence across racial/ethnic groups. An increased emphasis on policy and environmental strategies that support healthy eating and active living, in addition to education campaigns, might reduce these disparities. Environmental approaches supported by CDC through funded programs include ways to improve access to healthy foods in underserved communities (*19,20*), such as increased accessibility of supermarkets; expanding programs that promote the delivery of regionally grown farm produce to community institutions, farmers' markets, and individuals (Farm-to-Where-You-Are); and promotion of food policy councils to improve the food environment at the state and local levels. Work sites can follow recommendations of the Task Force on Community Preventive Services to implement programs intended to improve the diet and increase the physical activity of employees (*21*). Strategies to increase low- or no-cost physical activity opportunities in communities, including trails and parks, along with improvements to sidewalks, might also help to reduce disparities in obesity.

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Preterm Births — United States, 2007

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Preterm infants (those born at <37 completed weeks of gestation) are less likely to survive to their first birthday than infants delivered at higher gestational ages, and those who do survive, especially those born at the earlier end of the preterm spectrum, are more likely to suffer long-term disabilities than infants born at term (*1,2*). During 1981–2006, the U.S. preterm birth rate increased >30%, from 9.4% to 12.8% of all live births (*3*). Although lower during 2007 and 2008, the U.S. preterm birth rate remains higher than any year during 1981–2002 (*3,4*).

Substantial differences in preterm birth rates across racial/ethnic groups have long been noted (*5*). However, trends in preterm birth rates among the larger racial/ethnic groups often have differed, (*3,6*). During 1981–2006, rates rose steadily among births to non-Hispanic white mothers, increased modestly among births to Hispanics, and declined slightly for non-Hispanic black births (*3*). Declines were noted in preterm birth rates in 2007 and 2008 for each of these groups (*3,4*).

To examine differences in the risk for preterm birth by race/ethnicity, CDC analyzed final 2007 birth certificate data from the National Vital Statistics System (NVSS). For 2007, a total 4,316,211 births were reported, of which 546,602 (12.7%) were preterm (*3*). For the purposes of this study, gestational age was defined as the interval between the date of the last normal menses and the date of birth; the preterm birth rate is the number of preterm births per 100 total births in a given category. Racial/ethnic origin of the mother are self-reported. National gestational age data according to such attributes as educational attainment, income, and disability status are not available or not collected consistently in NVSS and therefore were not analyzed for this report. Comparable gestational age trend data were not available before the 1981 data year.

In 2007, approximately one of every five infants born to non-Hispanic black mothers was born preterm, compared with one of every eight to nine births to non-Hispanic white and Hispanic women. The 2007 preterm birth rate for non-Hispanic black infants (18.3%) was 59% higher than the rate for non-Hispanic white infants (11.5%) and 49% higher than the rate for Hispanic infants (12.3%) (Table). Among Hispanic groups, 2007 preterm rates ranged from 11.9% of infants born to mothers of Mexican origin to 14.5% of infants born to mothers of Puerto Rican origin.

Rates were higher for infants born to non-Hispanic black mothers at each preterm group: late preterm (34–36 weeks), early preterm (<34 weeks) and extremely preterm (<28 weeks). Non-Hispanic black infants are approximately three times as likely to be delivered extremely preterm as non-Hispanic white and Hispanic infants (1.9% compared with 0.6%). Among the Hispanic groups, extremely preterm birth was most common among births to Puerto Rican mothers (1.0% compared with 0.6%t for all other Hispanic groups).

TABLE. Preterm birth rates*, by race and ethnicity of mother — National Vital Statistics System, United States, 2007

Race/Ethnicity	Total preterm[†]	Extremely preterm[§]	Early preterm[¶]	Late preterm[**]
All births	**12.7**	**0.8**	**3.6**	**9.0**
White, non-Hispanic	**11.5**	0.6	3.0	8.5
Black, non-Hispanic	**18.3**	1.9	6.5	11.8
American Indian/ Alaska Native	**13.9**	0.7	4.0	9.9
Asian/Pacific Islander	**10.9**	0.5	2.8	8.1
All Hispanic	**12.3**	0.6	3.4	8.9
Mexican origin	**11.9**	0.6	3.3	8.6
Cuban origin	**13.4**	0.6	3.4	10.0
Puerto Rican origin	**14.5**	1.0	4.4	10.0
Central and South American origin	**12.1**	0.6	3.3	8.8

* Per 100 births in each specified gestational age category.
[†] Birth at <37 weeks' gestation.
[§] Birth at <28 weeks' gestation.
[¶] Birth at <34 weeks' gestation.
[**] Birth at 34–36 weeks' gestation.

The findings in this report are subject to at least one limitation. Last normal menses is subject to error from imperfect maternal recall or misidentification because of postconception bleeding, delayed ovulation, or intervening early miscarriage (*3*).

Although the gap between non-Hispanic whites and non-Hispanic blacks in preterm birth risk has narrowed somewhat during the past two decades, this change is attributable primarily to increases in preterm births among non-Hispanic white infants and not to substantial reductions in short gestations among non-Hispanic blacks (*4*). Demonstrated causes for the wide disparities in preterm risk by race/ethnicity include differences in socioeconomic status, prenatal care, maternal risk behaviors, infection, nutrition, stress, and genetics (*1*).

Preterm delivery is a complex problem, and the ability to predict and prevent such births is limited (*1*). The *Healthy People 2010* (HP2010) objective (no. 16-11) to reduce the preterm birth rate for all groups to 7.6% (*7*) is unlikely to be met; in 2007 the lowest race/ethnicity-specific rate reported, 10.9% for Asian/Pacific Islanders, was >40% higher than the HP2010 target. Expanded research is needed to understand the causes of preterm birth better and to eliminate the wide, persistent racial/ethnic differences in preterm risk.

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Potentially Preventable Hospitalizations — United States, 2004–2007

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When patients seek prompt attention from primary care providers for acute illnesses (e.g., pneumonia) or worsening of chronic conditions (e.g., diabetes), hospitalization often can be avoided. Hospitalizations that better primary care could have prevented are termed "potentially preventable hospitalizations." Although not all such hospitalizations can be avoided, rates of potentially preventable hospitalizations vary; communities with poorer access to coordinated primary care tend to have higher rates of potentially preventable hospitalizations (*1*).

Because hospitalizations tend to be more costly than outpatient primary care, potentially preventable hospitalizations also are used often as markers of the efficiency of the health-care system. The number and cost of excess potentially preventable hospitalizations can be calculated by comparing rates for a group with an ideal rate. These estimates can help communities identify potential cost savings associated with improving primary care and reducing potentially preventable hospitalizations.

To identify trends in a composite measure of potentially preventable hospitalizations among persons in the United States aged ≥18 years, the Agency for Healthcare Research and Quality (AHRQ) analyzed data for 2004–2007 from AHRQ's Healthcare Cost and Utilization Project (HCUP). Disparities related to race/ethnicity and income were examined. In addition, the impact of reducing preventable hospitalizations to a best rate was estimated in terms of numbers of admissions and associated costs.

HCUP is a family of health-care databases and related software tools and products developed through a federal-state-industry partnership and sponsored by AHRQ. HCUP databases combine the data-collection efforts of state data organizations, hospital associations, private data organizations, and the federal government to create a national information resource of discharge-level health-care data. HCUP includes the largest collection of longitudinal hospital care data in the United States with all-payer, encounter-level information, beginning with 1988. These databases enable research on different health policy topics, including cost and quality of health-care services, medical practice patterns, access to health-care programs, and outcomes of treatments at the national, state, and local levels. AHRQ's Prevention Quality Indicators (PQIs) are a set of measures that can be used with hospital inpatient discharge data to identify quality of care for ambulatory care-sensitive conditions (*2*). This analysis used version 3.1 of AHRQ's PQIs. The PQI composite includes adult admissions for diabetes (i.e., short-term complications, long-term complications, uncontrolled diabetes, and lower-extremity amputations), hypertension, congestive heart failure, angina without procedure, asthma, dehydration, bacterial pneumonia, and urinary infections. Admissions for chronic obstructive pulmonary disease were excluded because of *International Classification of Diseases* (Ninth Revision, Clinical Modification) coding changes that cause incompatibility across data years. Rates were adjusted by age group and sex, with the total U.S. population for 2000 used as the standard population.

Information regarding the socioeconomic status of patients typically is unavailable in hospital administrative data; therefore, a commonly used proxy is area income, which is based on the income of the neighborhood in which a patient lives. A patient's address is matched with that area's income derived from the 2000 U.S. Census. In this analysis, patients are divided into income quartiles on the basis of the median household income of the zip code of the patient's residence (*3*). Quartile cut-points were assigned on the basis of the population distribution in the United States. Quartile 1 refers to the lowest income communities, and quartile 4 refers to the wealthiest communities. Analyses by area income use the HCUP Nationwide Inpatient Sample. This database approximates a 20% stratified sample of U.S. community hospitals.

HCUP databases maintain a combined categorization of race and ethnicity. When a state and its hospitals collect data on Hispanic ethnicity separately from race, HCUP assigns the data to the combined race/ethnicity categorization and uses Hispanic ethnicity to override any other race category. Not all state hospital administrative data include information regarding race/ethnicity. To generate estimates by race/ethnicity for the national health-care quality and disparities reports, special State Inpatient Databases (SID) disparities analytic files were created (*3*). These files are designed to provide national estimates of disparities by using weighted records from a stratified sample of hospitals in multiple SIDs. For 2004, SIDs from 23 states (Arizona, Arkansas, California, Colorado, Connecticut, Florida, Georgia, Hawaii, Kansas, Maryland, Massachusetts, Michigan, Missouri, New Hampshire, New Jersey, New York, Rhode Island, South Carolina, Tennessee, Texas, Vermont, Virginia, and Wisconsin) were used. In 2005, the Oklahoma SID was added to the sampling frame, and a SID from Virginia was unavailable. In 2006, Utah and Virginia SID were added to the frame. In 2007, the Wyoming SID was added, for a total of 26 states in the sampling frame. Estimates are generated for non-Hispanic whites, non-Hispanic blacks, Asians/Pacific Islanders (A/PIs), and Hispanics. Estimates for American Indians/Alaskan Natives (AI/ANs) cannot be reported because of inconsistently available information on these discharges in the HCUP databases.

Numbers of excess preventable hospitalizations were estimated for 2007 by comparing adjusted rates of the AHRQ PQI composite between groups. For area income comparisons, each group was compared with residents of the highest income quartile neighborhood, which had the lowest hospitalization rate. For example, for excess preventable hospitalizations to be calculated for the lowest income quartile, the difference between the lowest and highest income quartiles was multiplied by the number of persons in the lowest income quartile.

For race/ethnicity comparisons, each group was compared with non-Hispanic whites. Although A/PIs have lower hospitalization rates, because the population is limited and estimates have larger standard errors, they were not selected as the comparison group. Differences between two groups were considered statistically significant when $p \leq 0.05$ on a two-tailed z-test, and all differences reported here meet this criterion for statistical significance. Similarly, changes over time were considered statistically significant if the difference between the first and last years met this criterion.

Costs associated with excess preventable hospitalizations were estimated by multiplying numbers of excess hospitalizations for a group by the average cost per case for that group. Total hospital charges were converted to costs by using HCUP's cost-to-charge ratios, which are based on hospital accounting reports from the Centers for Medicare and Medicaid Services. Costs are for the hospital cost of producing the services and do not include physician costs associated with the hospital stay.

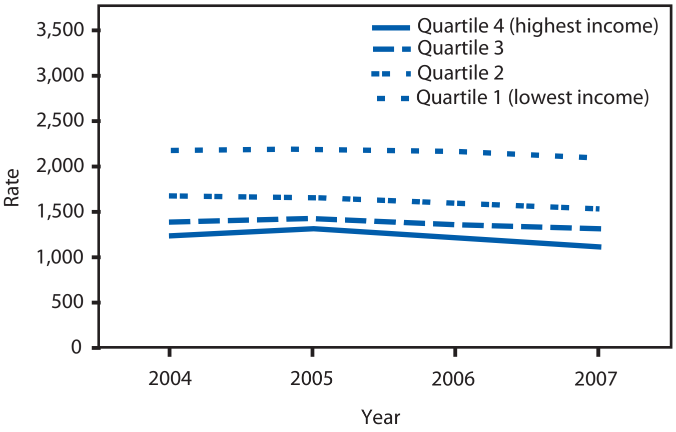
During 2004–2007, the AHRQ PQI composite rate of hospitalizations declined from 1,617 to 1,510 per 100,000 adults (Figure 1), perhaps reflecting greater attention to care coordination by hospitals and primary care providers. Adjusted rates of preventable hospitalizations did not change for any area income quartile. During this period, the rate of preventable hospitalizations was higher among residents of the two lower-income quartile neighborhoods (quartiles 1 and 2), compared with residents of the highest income quartile neighborhood (quartile 4).

Comparisons with the AHRQ PQI composite rate of hospitalizations for residents of the highest income quartile neighborhoods in 2007 were made to estimate excess preventable hospitalizations by area income (Figure 2). If residents of the lowest income quartile neighborhoods had had the same adjusted rate of preventable hospitalizations as residents of the highest income quartile neighborhoods, they would have had >560,000 fewer hospitalizations. Instead of costing $8.8 billion during 2007, preventable hospitalizations among income quartile 1 residents would have cost only $4.8 billion, saving $4.0 billion. If residents of income quartile 2 neighborhoods had had the same adjusted rate of preventable hospitalizations as residents of the highest income quartile neighborhoods, they would have had >240,000 fewer hospitalizations. Instead of costing $6.3 billion during 2007, preventable hospitalizations among income quartile 2 residents would have cost $4.5 billion, saving $1.8 billion. If residents of income quartile 3 neighborhoods had had the same adjusted rate of preventable hospitalizations as residents of the highest-income quartile neighborhoods, they would have had >110,000 fewer hospitalizations. Instead of costing $5.7 billion during 2007, preventable hospitalizations among income quartile 3 residents would have cost $4.8 billion, saving $900 million.

During 2004–2007, statistically significant declines in the AHRQ PQI composite rate of hospitalizations were observed among non-Hispanic whites, A/PIs, and Hispanics (Figure 3). During all years, the adjusted rate of preventable hospitalizations was higher among non-Hispanic blacks and Hispanics, compared with non-Hispanic whites. In addition, the adjusted rate was lower among non-Hispanic A/PIs, compared with non-Hispanic whites.

Comparisons with the AHRQ PQI composite rate of hospitalizations for non-Hispanic whites during 2007 were made to estimate

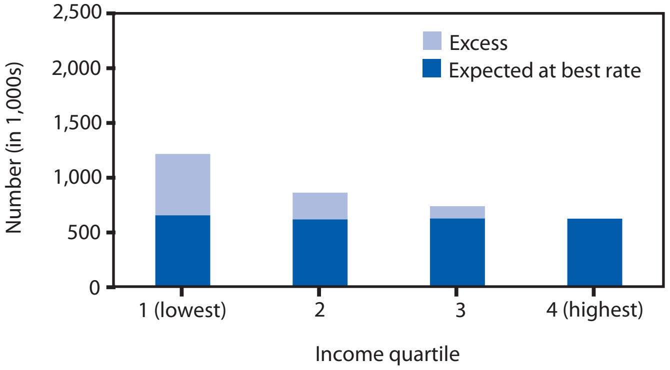
FIGURE 1. Preventable hospitalization rates* among adults, by area income — Agency for Healthcare Research and Quality, Prevention Quality Indicators, United States, 2004–2007



Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2004–2007.

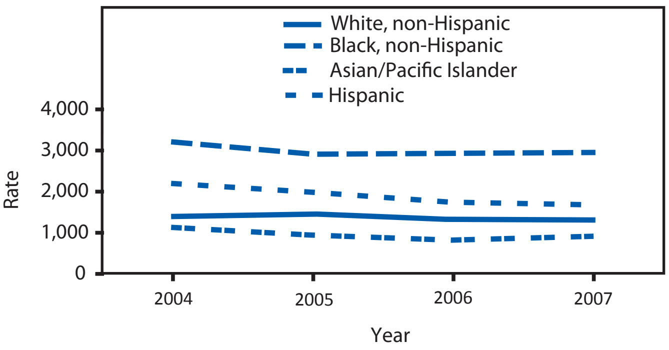
* Per 100,000 population.

FIGURE 2. Number of excess potentially preventable hospitalizations, by area income — Agency for Healthcare Research and Quality, Prevention Quality Indicators, United States, 2007



Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2007.

FIGURE 3. Preventable hospitalization composite rates* among adults, by race/ethnicity — United States, Agency for Healthcare Research and Quality, Prevention Quality Indicators, 2004–2007

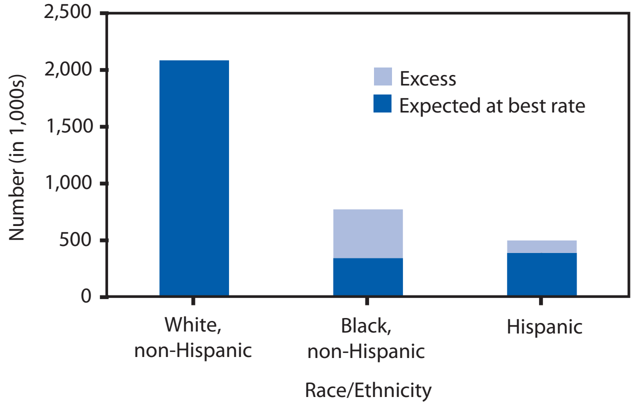


Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, State Inpatient Databases disparities analytic file, 2004–2007.
* Per 100,000 population.

excess preventable hospitalizations by race/ethnicity (Figure 4). If non-Hispanic blacks had had the same adjusted rate of preventable hospitalizations as non-Hispanic whites, they would have had approximately 430,000 fewer hospitalizations. Instead of costing $6.1 billion during 2007, preventable hospitalizations among non-Hispanic blacks would have cost $2.7 billion, saving $3.4 billion. If Hispanics had had the same adjusted rate of preventable hospitalizations as non-Hispanic whites, they would have had approximately 110,000 fewer hospitalizations. Instead of costing $4.2 billion during 2007, preventable hospitalizations among Hispanics would have cost $3.3 billion, saving $900 million.

The findings presented in this report are subject to at least four limitations. First, hospital administrative data might be incomplete. Second, data from only half of the 50 states were usable in this analysis, and individual states might differ in how conditions and race/ethnicity are coded. Third, although data analysis can examine disparities related to sex and geography, data were unavailable regarding patients' educational level or disability status and were insufficient to provide estimates for certain populations (i.e., AI/ANs, Native Hawaiians and Other Pacific Islanders, and persons of multiple races). Finally, cost estimates only capture hospital facility costs during the inpatient stay and do not include costs of inpatient physician visits or follow-up care.

FIGURE 4. Number of excess potentially preventable hospitalizations, by race/ethnicity — United States, Agency for Healthcare Research and Quality, Prevention Quality Indicators, 2007



Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, State Inpatient Databases disparities analytic file, 2007.

Analyses of potentially preventable hospitalizations can be used by communities in multiple ways. Communities with high overall rates can seek opportunities to improve primary care delivery. For example, CareOregon has implemented a medical home program that encouraged primary care practices to provide multidisciplinary, coordinated, comprehensive care to patients; this program enhanced access to care and reduced potentially preventable hospitalization rates (*4*).

Communities with large differences in rates across populations can examine whether specific groups face larger barriers to primary care, including barriers related to culture, language, and literacy. For example, the Commonwealth Care Alliance of Boston, Massachusetts, focuses on low-income elders and provides them with primary care teams that include physicians, nurse practitioners, and geriatric social workers; these teams provide care and care coordination and have led to reduced rates of potentially preventable hospitalizations and emergency department visits (*5*).

Communities also can examine rates to determine whether primary care needs to be improved for specific conditions. For example, Intermountain Healthcare assigned care managers to seniors with multiple chronic conditions; care managers developed individualized care plans to each plan and helped coordinate care through electronic health records. Among seniors with diabetes, hospitalizations, complications, and mortality were all reduced (*6*).

Moreover, estimates of the excess costs associated with potentially preventable hospitalizations can help communities justify investments in primary care that ultimately lead to reduced hospitalizations. Savings on preventable hospitalizations more than offset program costs in the Commonwealth Care Alliance and Intermountain Healthcare interventions (*5,6*).

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Current Asthma Prevalence — United States, 2006–2008

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Asthma is a chronic inflammatory disorder of the airways characterized by episodic and reversible airflow obstruction, airway hyper-responsiveness, and underlying inflammation. Common asthma symptoms include wheezing, coughing, and shortness of breath (*1*). With correct treatment and avoidance of exposure to environmental allergens and irritants that are known to exacerbate asthma, the majority of persons who have asthma can expect optimal symptom control (*2*).

Multiple reports provide detailed surveillance information on asthma (*1*,*3*–*6*). A 1987 report that included asthma surveillance data for 1965–1984 identified differences among certain demographic groups by age, sex, and race/ethnicity (*3*). Subsequent asthma surveillance reports confirmed these differences and documented that the differences have persisted over time (*1*,*4*). These reports indicate that population-based asthma prevalence rates, emergency department visit rates, and hospitalization rates were higher among blacks than among whites, higher among females than among males, higher among children than among adults, and higher among males aged 0–17 years than among females in the same age group. In addition, more detailed analysis of ethnicity data demonstrated that different Hispanic groups had differing health outcomes. Among Hispanics, those of Puerto Rican descent (origin or ancestry) had higher asthma prevalence and death rates than other Hispanics (e.g., those of Mexican descent), non-Hispanic blacks, and non-Hispanic whites (*5*,*6*).

To examine whether disparities in asthma prevalence exist among certain demographic groups, CDC analyzed data from the National Health Interview Survey (NHIS) for 2006–2008. NHIS is an annual, in-person survey of the civilian, noninstitutionalized U.S. population based on a multistage sampling of households (*7*). An adult family member is selected to act as a proxy respondent for children. NHIS routinely includes two questions that are used to estimate national asthma prevalence. The question, "Have you ever been told by a doctor or other health professional that you had asthma?" has been used as a lifetime prevalence measure for asthma since 1997. A second question, "Do you still have asthma?" was added in 2001 to assess current asthma prevalence. Consistent with previous CDC publications, respondents were considered to have current asthma if they answered "yes" to both questions (*1*,*4*). Race/ethnicity was categorized on the basis of the respondents' self-reported classification. Results for four racial/ethnic groups are reported: non-Hispanic white, non-Hispanic black, multiracial, and Hispanic of Puerto Rican descent. Current asthma prevalence also was estimated by sex (males and females), age group (children aged 0–17 years and adults aged ≥18 years), and federal poverty level. Analyses of disparities in disability status, education, geographic region, and other racial/ethnic populations were not included because of low prevalence or limitations due to data quality or manuscript length. Three years of survey data were combined to provide more stable estimates for relatively small groups. Analysis software accounted for complex sample design, and sample weights were used to produce national estimates. Estimates were age-adjusted by using the year 2000 age distribution, except those for children. Comparative terms used in this report (e.g., "higher" and "similar") indicate the results of statistical testing at $p<0.05$.

During 2006–2008, an estimated 7.8% of the U.S. population had current asthma (Table). Current asthma prevalence was higher among the multiracial (14.8%), Puerto Rican Hispanics (14.2%), and non-Hispanic blacks (9.5%) than among non-Hispanic whites (7.8%). Current asthma prevalence also was higher among children (9.3%) than among adults (7.3%), among females (8.6%) than among males (6.9%), and among the poor (11.2%) than among the near-poor (8.4%) and nonpoor (7.0%).*

When examined within the three federal poverty levels, prevalence by race/ethnicity was different than when race/ethnicity was examined alone. Among the poor, non-Hispanic whites and non-Hispanic blacks had similar prevalence (12.5% and 12.2%, respectively). In contrast, Puerto Rican Hispanics and the multiracial also had similar but substantially higher prevalence (22.4% and 20.5%, respectively). Among the near-poor, non-Hispanic blacks and non-Hispanic whites had similar prevalence (9.7% and 9.2%, respectively), and Puerto Rican Hispanics and the multiracial also had similar prevalence (14.9% and 13.6%, respectively). Among the nonpoor, non-Hispanic blacks had higher prevalence than non-Hispanic whites (8.4% and 7.0%, respectively). In contrast, the multiracial and Puerto Rican Hispanics had similar prevalence (13.4% and 10.4%, respectively).

For children (9.3% prevalence), current asthma prevalence was higher among Puerto Rican Hispanics (18.4%), non-Hispanic blacks (14.6%), and the multiracial (13.6%) than among non-Hispanic whites (8.2%). Asthma prevalence was higher among males (10.7%) than among females (7.8%). Among poor children, Puerto Rican children, multiracial children, and non-Hispanic black children had higher asthma prevalence (23.3%, 21.1%, and 15.8%, respectively) than poor non-Hispanic white children (10.1%) (Table).

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* Poor = federal poverty level (FPL) <1, near-poor = FPL level 1–<2, and nonpoor = FPL ≥2. FPL was based on U.S. Census poverty thresholds, available at http://www.census.gov/hhes/www/poverty.html.

TABLE. Prevalence[*] of current asthma[†] among children[§] and adults,[§] by sex, race/ethnicity, and poverty level[¶] — United States, National Health Interview Survey, 2006–2008

	Children		Adults		Total	
Characteristic	**%**	**(95% CI)**	**%**	**(95% CI)**	**%**	**(95% CI)**
Race/Ethnicity						
White, non-Hispanic	8.2	(7.6–8.9)	7.7	(7.3–8.0)	**7.8**	**(7.5–8.1)**
Black, non-Hispanic	14.6	(13.4–15.9)	7.8	(7.2–8.4)	**9.5**	**(9.0–10.1)**
Multiracial	13.6	(11.1–16.6)	15.1	(12.7–18.0)	**14.8**	**(12.7–17.0)**
Hispanic, Puerto Rican descent[**]	18.4	(14.9–22.5)	12.8	(10.9–14.9)	**14.2**	**(12.5–16.2)**
Male	**10.7**	**(10.1–11.4)**	**5.5**	**(5.2–5.9)**	6.9	(6.6–7.2)
White, non-Hispanic	9.5	(8.6–10.5)	5.9	(5.5–6.4)	**6.8**	**(6.4–7.3)**
Black, non-Hispanic	16.5	(14.9–18.2)	5.7	(4.9–6.6)	**8.5**	**(7.7–9.3)**
Multiracial	14.6	(10.9–19.5)	11.2	(8.0–15.3)	**12.1**	**(9.4–15.3)**
Hispanic, Puerto Rican descent	23.6	(18.0–30.2)	7.0	(4.8–10.1)	**11.3**	**(9.0–14.0)**
Female	**7.8**	**(7.2–8.4)**	**8.9**	**(8.6–9.3)**	8.6	(8.3–9.0)
White, non-Hispanic	6.9	(6.1–7.8)	9.3	(8.8–9.8)	**8.7**	**(8.3–9.1)**
Black, non-Hispanic	12.7	(11.0–14.5)	9.5	(8.7–10.3)	**10.3**	**(9.5–11.1)**
Multiracial	12.6	(9.2–16.9)	19.1	(15.4–23.4)	**17.4**	**(14.5–20.8)**
Hispanic, Puerto Rican descent	13.0	(9.7–17.3)	18.2	(15.5–21.2)	**16.9**	**(14.6–19.4)**
Poor	**11.7**	**(10.6–12.9)**	**11.0**	**(10.2–11.9)**	11.2	(10.5–12.0)
White, non-Hispanic	10.1	(8.1–12.5)	13.3	(11.9–14.7)	**12.5**	**(11.3–13.8)**
Black, non-Hispanic	15.8	(13.7–18.3)	10.9	(9.6–12.4)	**12.2**	**(11.0–13.4)**
Multiracial	21.1	(15.4–28.2)	20.2	(14.3–27.8)	**20.5**	**(15.6–26.4)**
Hispanic, Puerto Rican descent	23.3	(16.8–31.4)	22.1	(17.6–27.4)	**22.4**	**(18.7–26.7)**
Near-poor	**9.9**	**(8.8–11.0)**	**7.9**	**(7.2–8.5)**	8.4	(7.8–8.9)
White, non-Hispanic	9.5	(7.8–11.5)	9.1	(8.2–10.0)	**9.2**	**(8.4–10.0)**
Black, non-Hispanic	14.3	(12.1–16.9)	8.1	(6.8–9.6)	**9.7**	**(8.5–11.0)**
Multiracial	16.1	(10.5–24.0)	12.8	(8.3–19.0)	**13.6**	**(9.7–18.8)**
Hispanic, Puerto Rican descent	17.9	(12.0–26.0)	13.9	(9.4–20.1)	**14.9**	**(11.1–19.8)**
Nonpoor	**8.2**	**(7.7–8.8)**	**6.6**	**(6.3–6.9)**	7.0	(6.7–7.3)
White, non-Hispanic	7.6	(7.0–8.3)	6.8	(6.4–7.2)	**7.0**	**(6.7–7.4)**
Black, non-Hispanic	13.6	(11.8–15.7)	6.5	(5.8–7.4)	**8.4**	**(7.6–9.2)**
Multiracial	9.2	(6.4–13.2)	14.9	(11.5–19.1)	**13.4**	**(10.8–16.6)**
Hispanic, Puerto Rican descent	14.0	(10.0–19.3)	9.1	(6.8–12.2)	**10.4**	**(8.3–13.0)**
Total	**9.3**	**(8.9–9.7)**	**7.3**	**(7.0–7.5)**	**7.8**	**(7.6–8.0)**

Abbreviation: CI = confidence interval.

[*] Age-adjusted, except for estimates regarding children.

[†] Includes persons who answered "yes" to the questions, "Have you ever been told by a doctor or other health professional that you had asthma?" and "Do you still have asthma?"

[§] Children aged 0–17 years; adults aged ≥18 years.

[¶] Poor = federal poverty level (FPL) <1, near-poor = FPL level 1–<2, and nonpoor = FPL ≥2. FPL was based on U.S. Census poverty thresholds, available at http://www.census.gov/hhes/www/poverty.html.

[**] Origin or ancestry.

For adults (7.3% prevalence), current asthma prevalence was higher among the multiracial (15.1%) and Puerto Rican Hispanics (12.8%) than among non-Hispanic blacks (7.8%) and non-Hispanic whites (7.7%). Asthma prevalence was higher among women (8.9%) than among men (5.5%). Among poor adults, Puerto Rican adults and multiracial adults had higher asthma prevalence (22.1% and 20.2%, respectively) than poor non-Hispanic black adults (10.9%) (Table).

For females of all ages (8.6% prevalence), current asthma prevalence was higher among the multiracial (17.4%), Puerto Rican Hispanics (16.9%), and non-Hispanic blacks (10.3%) than among non-Hispanic whites (8.7%). For males of all ages (6.9% prevalence), current asthma prevalence was higher among the multiracial (12.1%), Puerto Rican Hispanics (11.3%), and non-Hispanic blacks (8.5%) than among non-Hispanic whites (6.8%) (Table).

Because prevalence estimates for years before 2001 are not comparable to current definitions of asthma prevalence, only a limited number of years are available for trend analysis. The prevalence differences between men and women, adults and children, non-Hispanic whites and non-Hispanic blacks, and poverty levels have not changed since 2001. The multiracial and Puerto Rican race/ethnicity groups are too small to produce reliable single-year estimates for assessing trends.

The results of this analysis are subject to at least four limitations. First, the asthma prevalence estimates in this report rely on self-report and are subject to recall bias. The respondent must correctly recall a physician diagnosis of asthma, which in turn requires that the physician diagnosis was correct and that the diagnosis was conveyed to the person. Because no definitive test exists for asthma, the diagnosis and self-report cannot be validated; however, a 1993 review of asthma questionnaires documented a mean sensitivity of 68% and a mean specificity of 94% when self-reported information on an asthma diagnosis was compared with a clinical diagnosis (*1*). Second, common to the majority of survey data, results might be biased because of response rates. NHIS is conducted by personal interview and had household response rates between 85% and 87% for the years included in this report. Third, because NHIS includes only the civilian, noninstitutionalized population of the United States, results might not be representative of other populations. Finally, because NHIS is conducted only in English and Spanish, results might not be representative of households whose residents have other primary languages.

The findings of this report indicated that within the U.S. population, current asthma prevalence varied by multiple demographic and economic groups. Asthma was more prevalent among females, children, the poor, the multiracial, and Puerto Rican Hispanics. Findings from this report are comparable to those of previous reports (*1*,*3*,*4*).The exact cause of asthma is unknown, but health management strategies for asthma that take into consideration cultural and population-specific characteristics can reduce the occurrence and severity of asthma exacerbations (*8*).

Although the reasons for the disparities identified in this report are unclear, observed differences in asthma prevalence among certain demographic and socioeconomic groups (e.g., females, children, non-Hispanic blacks, Puerto Rican Hispanics, and the poor) might be indicators for underlying differences in genetic factors, higher levels of exposure to environmental irritants (e.g., tobacco smoke or air pollutants), and environmental allergens (e.g., house dust mites, cockroach particles, cat and dog dander, and mold). After asthma is diagnosed, heath-care access and actual use of the health-care system, financial resources, and social support are required to manage the disease effectively on a long-term basis (*8*–*10*). Research into the role of these factors among disproportionately affected demographic and socioeconomic groups can identify additional asthma control opportunities in these populations. Promoting targeted interventions that take into account cultural differences and population-specific characteristics can improve asthma management and subsequently reduce the asthma burden among disproportionally affected demographic and socioeconomic groups. For children, the use of multitrigger, multicomponent environmental interventions to improve symptom control and reduce missed days of school is recommended (*11*).

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HIV Infection — United States, 2005 and 2008

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Approximately 1.1 million adults and adolescents are living with human immunodeficiency virus (HIV) infection in the United States, with 48,200–64,500 persons newly infected each year (*1,2*). At the beginning of the HIV epidemic in the United States in the early 1980s, the majority of persons with an HIV diagnosis were white men who have sex with men (MSM) (*3,4*). MSM continue to comprise a substantial proportion of persons newly infected with HIV, and the proportion of HIV infections among racial/ethnic minorities and women has increased (*5*). (These categories are not mutually exclusive.) Monitoring the burden of the epidemic among specific population groups provides guidance for targeting prevention and treatment efforts and allows assessment of intervention success.

HIV infection is a notifiable disease in all states and the District of Columbia (DC). Since 1982, all 50 U.S. states and DC have reported stage 3-HIV infection, acquired immunodeficiency syndrome (AIDS), to CDC in a uniform format. In 1994, CDC implemented data management for national surveillance of early-stage HIV infection integrated with AIDS case surveillance, at which time 25 states with confidential, name-based HIV surveillance began submitting de-identified case reports to CDC. Eventually, additional states implemented name-based HIV surveillance, and all states had implemented such surveillance by April 2008. CDC regards data from states with confidential, name-based, HIV surveillance systems as sufficient to monitor trends for HIV infection after 4 continuous years of reporting (*5*).

To determine the number of persons aged ≥13 years who received a diagnosis of HIV infection during 2005 and 2008, CDC analyzed data from the national HIV surveillance system reported through June 2009. Analysis was limited to the 37 states that had reported HIV cases since at least January 2005 to allow for estimation of diagnoses rates. Rates per 100,000 population were calculated for 2005 and 2008 by sex and race/ethnicity, with population denominators based on postcensal estimates from the U.S. Census Bureau (*6*). Disparities in HIV diagnosis rates were assessed by using relative percentage difference, a relative measure of disparity recommended by CDC's National Center for Health Statistics to compare variations (*7*). The relative percentage difference in HIV diagnosis rates was calculated for each racial/ethnic group, using the rates among whites as the referent ([{rate of interest – rate among whites} / rate among whites] × 100). Rates were compared with whites as the referent group because whites typically have the lowest or second-lowest diagnosis rates, and the numerator provides a stable rate. Percentage difference also was calculated for males compared with females by using females as the referent population (*7*). For transmission categories, analysis was limited to all men and MSM as a result of the availability of denominator data (*8*); the category of all men was used as the referent group. MSM denominator was calculated by using data on reports of the proportion of men who engaged in same-sex behavior during the previous 5 years and by using the point estimate (4.0%); however, the denominator might vary (95% confidence interval = 2.8–5.3) (*8*). Analyses were adjusted for reporting delays (i.e., the time between diagnosis and report) and for missing risk factor information (*5*). Data were not available for all states, so a state breakdown of disparities is not provided. Because data on income, education, and disability status were not available, these factors were not included in the analysis.

In the 37 states for which data were analyzed, a total of 35,526 persons aged ≥13 years received a diagnosis of HIV in 2005, and 34,038 received such a diagnosis in 2008. During 2008, the relative percentage difference in the HIV diagnosis rate among blacks/African-Americans compared with whites was 799%; the next highest differences were among Hispanics/Latinos (205%), Native Hawaiians/Other Pacific Islanders (NH/OPI) (178%), persons reporting multiple races (72%), and American Indians/Alaska Natives (AI/ANs) (45%) (Table). Asians had a lower HIV diagnosis rate than whites (relative percentage difference: -12%). During 2005–2008, rates of diagnoses of HIV infection among AI/ANs, Asians, and blacks/African-Americans increased, with a change in the relative percentage difference of 16%, 12%, and 46%, respectively. The rates among Hispanics/Latinos, NH/OPIs, and persons reporting multiple races decreased, with a decrease in the relative percentage difference because the rate among whites remained stable. In 2008, the relative percentage difference of HIV diagnoses among males compared with females was 212%, and the rate among males increased during 2005–2008, with a change in the relative percentage difference of 24%.

Although the racial/ethnic disparities in rates of HIV diagnoses among males are similar to the disparities observed for the racial/ethnic groups overall, more pronounced differences occurred among females. In 2008, among females, the relative percentage difference in HIV diagnosis rates compared with whites was 1,831% for blacks/African-Americans, 359 for Hispanics/Latinos, 266 for NH/OPIs, 310 for persons of multiple races, 138 for AI/ANs, and 3% for Asians. However, during 2005–2008, the relative differences decreased for all racial/ethnic females, compared with whites. The largest relative percentage difference was observed for MSM com-

TABLE. Estimated rate[*] of human immunodeficiency virus (HIV) infection diagnoses among persons aged ≥13 years — CDC's national HIV surveillance system, 37 states, 2005 and 2008

	2005 rate	Relative difference[†] (%)	2008 rate	Relative difference (%)	Change 2005–2008 (%)
Race/Ethnicity					
American Indian/Alaska Native	10.3	28.8	11.9	45.1	16.4
Asian	6.1	-23.8	7.2	-12.2	11.6
Black/African-American	68.2	752.5	73.7	798.8	46.3
Hispanic/Latino[§]	26.6	232.5	25.0	204.9	-27.6
Native Hawaiian/Other Pacific Islander	34.8	335.0	22.8	178.0	-157.0
White	8.0	—[¶]	8.2	—	—
Multiple race	19.7	146.3	14.1	72.0	-74.3
Sex					
Males	33.7	188.0	35.9	212.2	24.1
Females	11.7	—	11.5	—	—
Male					
American Indian/Alaska Native	18.6	13.4	23.4	41.0	27.5
Asian	11.6	-29.3	14.8	-10.8	18.4
Black/African-American	118.0	619.5	131.9	694.6	75.1
Hispanic/Latino	53.8	228.0	52.3	215.1	-13.0
Native Hawaiian/Other Pacific Islander	69.3	322.6	48.2	190.4	-132.2
White	16.4	—	16.6	—	—
Multiple race	45.4	176.8	33.6	102.4	-74.4
Female					
American Indian/Alaska Native	7.9	182.1	6.9	137.9	-44.2
Asian	3.3	17.9	3.0	3.4	-14.4
Black/African-American	56.9	1,932.1	56.0	1,831.0	-101.1
Hispanic/Latina	15.7	460.7	13.3	358.6	-102.1
Native Hawaiian/Other Pacific Islander	19.9	610.7	10.6	265.5	-345.2
White	2.8	—	2.9	—	—
Multiple race	18.0	542.9	11.9	310.3	-232.5
Transmission category					
Men who have sex with men	579.8	5,189.3	655.6	6,407.7	1,218.4
All other males	11.0	—	10.1	—	—

[*] Per 100,000 population.

[†] The relative percentage difference in HIV diagnosis rates was calculated for each racial/ethnic group using the rates among whites as the referent ([{rate of interest – rate among whites} / rate among whites] x 100).

[§] Hispanic/Latino can be of any race.

[¶] Referent.

pared with all other men (6,408% in 2008), as well as the largest change from 2005 to 2008 (1,218%).

The data presented in this report are subject to at least four limitations. First, HIV infection diagnoses might reflect both HIV incidence and testing patterns; therefore, a person might receive a diagnosis close to or many years after acquiring an HIV infection. Second, data were unavailable from certain states. According to the number of AIDS cases diagnosed through 2008, the 37 states for which data were used represent approximately 68% of AIDS diagnoses throughout the 50 states and DC. Certain areas with historically high AIDS morbidity that have not conducted confidential, name-based HIV surveillance since January 2005 (e.g., California, Illinois, and Maryland) were not included, and thus the results might not be nationally representative. Third, for transmission categories, denominator data were available for MSM only; when denominator data for injection-drug users and heterosexuals become available in the future, disparities among these groups also can be estimated. Finally, adjustment for reporting delays might be inaccurate and result in less stable rates for the latest years.

Racial/ethnic minorities, except Asians, continue to experience a disproportionate burden of HIV infection diagnoses, as do MSM. The disparities continue to widen among black/African-American and AI/AN males, compared with white males. Although differences are narrowing among other males and females, ongoing and culturally appropriate intervention is needed to address these disparities. In addition, the increasing HIV infection rates among MSM highlight the need for expanded prevention efforts. Interventions should continue to target behavior risk factors and include structural interventions to address social determinants of health to reduce health disparities and promote health equity. Information regarding proven behavior interventions for high-risk populations has been published (*9,10*). Person-to-person behavior interventions for MSM can be implemented at the individual, group, and community level. Components can include providing information and skill-building to change knowledge, attitudes, beliefs, and self-efficacy (*10*).

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Diabetes — United States, 2004 and 2008

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Diabetes is a serious, costly, and potentially preventable public health problem in the United States (*1–3*). Both the prevalence and incidence of diabetes have increased rapidly since the mid-1990s, with minority racial/ethnic groups and socioeconomically disadvantaged groups experiencing the steepest increases and most substantial effects from the disease (*1,4–6*).

To assess disparities in the prevalence and incidence of medically diagnosed diabetes, CDC used data from the 2004 and 2008 National Health Interview Survey (NHIS), an ongoing, cross-sectional, in-person household interview survey of the civilian, noninstitutionalized U.S. population. A randomly selected adult (aged ≥18 years) in each family was asked whether they had ever been told by a health-care professional that they had diabetes; those who reported having diagnosed diabetes were asked the age at which they received the diagnosis. Respondents who were the same age when interviewed as when they received a diabetes diagnosis were considered to have a case of incident diabetes (Age at interview – Age at diagnosis = 0 years). In addition, half of the cases among respondents who were aged 1 year older when they were interviewed than when they received the diagnosis were counted as incident cases (Age at interview – Age at diagnosis = 1 year). Both the values for age at interview and age at diagnosis were rounded to the nearest year; therefore, among respondents with a difference of 1 year (Age at interview – Age at diagnosis = 1 year), the actual duration with diagnosed diabetes was in the interval (0, 2). Durations were assumed to be spread uniformly over the interval (0, 2), and half were assumed to be within 1 year of diagnosis. Prevalence (cases of diabetes of any duration per 100 population) was calculated for adults aged ≥18 years. Incidence (cases of diabetes ≤1 year's duration per 1,000 population) was calculated for adults aged 18–79 years.

Analyses were performed to assess disparities between groups, defined by age, sex, race/ethnicity, socioeconomic position (measured as educational attainment and poverty to income ratio [PIR]) (*7*), disability status, and U.S. Census region. Persons with a disability were adults with either a functional limitation from any condition or a health problem that required use of special equipment (*8*). In each disparity domain (i.e., classifying variable), the group with the lowest stable estimate (i.e., relative standard error <30%) of diabetes prevalence or incidence was chosen as the referent category; for racial/ethnic disparities, white men and white women, the largest groups, were selected as the referent category (*9,10*). Absolute difference was calculated by subtracting the value in the referent category from each category of the classifying variable. Relative difference (percentage difference) was calculated by dividing the absolute difference by the value in the referent category. For example, with women as the referent category, the relative difference in prevalence between men and women is the absolute difference divided by the value for women with the fraction expressed as a percentage. To assess whether disparities changed with time, the difference between group relative differences that were significant in the 2008 and 2004 data were calculated (*9,10*). Statistically significant increases and decreases in relative difference from 2004 to 2008 were interpreted as increases and decreases in disparity over time, respectively. In all analyses, data were weighted to provide estimates representative of the U.S. population. Estimates were age adjusted to the U.S. 2000 Census population (*11*). The z statistic and a two-tailed test with Bonferroni correction were used to test for statistical significance of absolute differences and the change in relative difference between 2004 and 2008. Differences were considered statistically significant at $p<0.05$.

Substantial racial/ethnic disparities were identified between the 2008 age-standardized prevalence of medically diagnosed diabetes for each nonwhite group and for whites (Table 1). Overall and for either sex, absolute differences were statistically significant ($p<0.05$) for blacks and Hispanics but not for Asians. Substantial socioeconomic disparities also were identified in the age-standardized prevalence of diagnosed diabetes. Statistically significant absolute differences increased with decreasing levels of education attained and levels of PIR; the greatest disparities were experienced by the groups who had the lowest level of education, were living below the federal poverty level, or both. Statistically significant differences in prevalence of diagnosed diabetes were also found, according to disability status, age, and U.S. Census region (i.e., the South in 2008). The absolute age-specific differences increased with age, reflecting the expected age-related increase in diabetes risk (*1,12*). The significant absolute difference in age-standardized prevalence of diagnosed diabetes between the groups with and without disability might reflect the association between diabetes and disability (*13*). The geographic disparity observed for the South is consistent with recent reports of geospatial variation in the prevalence of diagnosed diabetes (*14*). All relative disparities in prevalence demonstrated similar patterns.

Changes across time occurred in the racial/ethnic, age, and education disparities in the age-standardized prevalence of diagnosed diabetes observed for 2008 and 2004 (Table 1). Relative differences in the aged-standardized prevalence of diagnosed diabetes among Hispanic and black women were significantly lower during 2008 than 2004. No significant change occurred among men or among both sexes combined. The relative difference between the age-specific prevalence of diagnosed diabetes for the referent category (18–44

TABLE 1. Age-adjusted prevalence[*] of medically diagnosed diabetes among adults aged ≥18 years, by selected characteristics — National Health Interview Survey, United States, 2004 and 2008

	2004				2008				
Characteristic	Age-adjusted %	(95% CI)	Absolute difference	Relative difference %	Age-adjusted %	(95% CI)	Absolute difference	Relative difference %	Change in relative difference from 2004 to 2008
Sex									
Male	7.5	(6.9–8.1)	1.1[†]	17.2	8.1	(7.5–8.7)	0.4	5.2	–12.0
Female	6.4	(6.0–6.8)	Ref.	Ref.	7.7	(7.1–8.3)	Ref.	Ref.	Ref.
Race/Ethnicity									
Both sexes									
White	6.0	(5.6–6.4)	Ref.	Ref.	7.0	(6.6–7.4)	Ref.	Ref.	Ref.
Black	10.6	(8.8–12.4)	4.6[†]	76.7	11.0	(9.6–12.4)	4.0[†]	57.1	–19.6
Asian	8.9	(4.2–13.6)	2.9	48.3	8.2	(6.0–10.2)	1.2	17.1	–31.2
Hispanic[§]	10.3	(8.5–12.1)	4.3[†]	71.7	10.7	(9.3–12.1)	3.7[†]	52.9	–18.6
Male									
White	6.7	(6.1–7.3)	Ref.	Ref.	7.3	(6.5–8.0)	Ref.	Ref.	Ref.
Black	10.3	(8.3–12.3)	3.6[†]	53.7	10.4	(8.4–12.4)	3.2[†]	43.8	–9.8
Asian	8.8	(6.8 –10.8)	2.1	31.3	9.4	(6.5–12.3)	2.1	28.8	–2.5
Hispanic	10.0	(8.0–12.0)	3.3[†]	49.3	11.1	(8.9–13.3)	3.8[†]	52.1	2.8
Female									
White	5.4	(4.8–6.0)	Ref.	Ref.	6.7	(6.1–7.3)	Ref.	Ref.	Ref.
Black	10.7	(9.1–12.3)	5.3[†]	98.1	11.4	(9.8–13.0)	4.7[†]	70.1[¶]	–28.0[¶]
Asian	8.6	(2.1–15.1)	3.2	59.3	7.2	(4.9–9.6)	0.5	7.5	–51.8
Hispanic	10.5	(8.9–12.1)	5.1[†]	96.4	10.5	(9.9–11.1)	3.8[†]	56.7[¶]	–39.7[¶]
Education level									
<High school	9.7	(8.7–10.7)	3.7[†]	61.7	11.8	(11.4–12.2)	5.6[†]	90.3[¶]	28.6[¶]
High school	7.0	(6.4–7.6)	1.0[†]	16.7	9.0	(8.8–9.2)	2.8[†]	45.2[¶]	28.5[¶]
>High school	6.0	(5.6–6.4)	Ref.	Ref.	6.2	(6.1–6.3)	Ref.	Ref.	Ref.
Poverty to income ratio[**]									
Poor, <1	11.4	(9.8–13.0)	5.9[†]	107.3	11.7	(10.3–13.1)	6.2[†]	112.7	5.4
Near-poor, 1.0–1.9	9.0	(7.2–10.8)	3.5[†]	63.6	10.4	(8.6–12.2)	4.9[†]	89.1	25.5
Middle income, 2.0–3.9	6.5	(5.7–7.3)	1.0[†]	18.2	8.3	(7.5–9.1)	2.8[†]	50.9	32.7
High income, ≥4.0	5.5	(4.7–6.3)	Ref.	Ref.	5.5	(4.9–6.1)	Ref.	Ref.	Ref.
Disability status									
Disability	10.5	(9.1–11.9)	6.1[†]	138.6	12.5	(10.7–14.3)	7.8[†]	166.0	27.4
No disability	4.4	(3.6–5.2)	Ref.	Ref.	4.7	(3.9–5.5)	Ref.	Ref.	Ref.
Age group (yrs)[††]									
18–44	1.9	(1.3–2.5)	Ref.	Ref.	2.3	(1.5–3.1)	Ref.	Ref.	Ref.
45–64	10.1	(8.5–11.7)	8.2[†]	431.6	12.0	(10.2–13.8)	9.7[†]	421.7[¶]	–9.9[¶]
65–74	18.2	(14.5–21.9)	16.3[†]	857.9	19.8	(16.3–23.3)	17.5[†]	760.9[¶]	–97.0[¶]
≥75	16.0	(12.5–19.5)	14.1[†]	742.1	16.9	(13.4–20.4)	14.6[†]	634.8[¶]	–107.3[¶]
U.S. Census region									
Northeast	6.1	(5.3–6.9)	Ref.	Ref.	7.2	(6.2–8.2)	Ref.	Ref.	Ref.
Midwest	6.9	(6.1–7.7)	0.8	13.1	7.4	(6.6–8.2)	0.2	2.8	–10.3
South	7.8	(7.2–8.4)	1.7	27.9	8.7	(7.9–9.5)	1.5[†]	20.8	–7.1
West	6.1	(5.9–6.3)	0	0	7.5	(6.7–8.3)	0.3	0	0

Abbreviation: CI = confidence interval.

[*] Cases of diabetes of any duration per 100 population.

[†] Difference between group estimate and referent category significant at p<0.05 by z statistic and a two-tailed test with Bonferroni correction.

[§] Persons of Hispanic ethnicity might be of any race.

[¶] Difference between the relative differences in 2008 and 2004 significant at p<0.05 by z statistic and a two-tailed test with Bonferroni correction.

[**] On the basis of the U.S. poverty level.

[††] Age-specific estimates are not age adjusted.

years) and each of the age groups (45–64, 65–74, and ≥75 years) was significantly lower during 2008 than 2004. However, the relative differences between the age-standardized prevalence of diagnosed diabetes among persons who had a high school education or less and the referent category (more than high school) were significantly higher during 2008 than 2004.

For 2008, statistically significant socioeconomic, age, and disability disparities were identified in the age-standardized incidence of diagnosed diabetes (Table 2). Absolute differences between the incidence rates of diagnosed diabetes in the groups with a high school education or less and the rate in the referent category (more than high school) were significant. Absolute differences between the

TABLE 2. Age-standardized incidence rate* of medically diagnosed diabetes among adults aged 18–79 years, by selected characteristics — National Health Interview Survey, United States, 2004 and 2008

	2004				2008				
Characteristic	Age-adjusted incidence rate	(95% CI)	Absolute difference	Relative difference (%)	Age-adjusted incidence rate	(95% CI)	Absolute difference	Relative difference (%)	Change in relative difference from 2004 to 2008
Sex									
Male	8.3	(8.1–8.5)	1.5	22.1	8.4	(8.2–8.6)	0.3	3.7	–18.4
Female	6.8	(6.6–7.0)	Ref.	Ref.	8.1	(7.9–8.3)	Ref.	Ref.	Ref.
Race/Ethnicity									
Both sexes									
White	6.5	(6.3–6.7)	Ref.	Ref.	8.0	(7.8–8.2)	Ref.	Ref.	Ref.
Black	8.2	(7.8–8.6)	1.7	26.2	8.0	(7.6–8.4)	0	0	–26.2
Hispanic[†]	11.1	(10.5–1.7)	4.6	70.8	11.5	(11.1– 11.9)	3.5	43.8	–27.0
Male									
White	7.7	(7.5–7.9)	Ref.	Ref.	8.0	(7.8–8.2)	Ref.	Ref.	Ref.
Black	9.6	(8.8–10.4)	1.9	24.7	7.0	(6.6–7.4)	–1.0	12.5	–12.2
Hispanic	7.3	(6.9–7.7)	–0.4	5.2	13.2)	(12.6–13.8)	6.2	77.5	72.3
Female									
White	5.4	(5.2–5.6)	Ref.	Ref.	8.2	(8.0–8.4)	Ref.	Ref.	Ref.
Black	7.0	(6.6–7.4)	1.6	29.6	8.9	(8.5–9.3)	0.7	8.5	–21.1
Hispanic	14.6	(13.8–15.4)	9.2[†]	170.4	13.1	(12.5–13.7)	4.9	59.8	110.6
Education level									
<High school	10.7	(10.3–11.1)	4.0[§]	59.7	15.1	(14.5–15.7)	8.9[§]	143.5[¶]	83.8[¶]
High school	7.9	(7.7–8.1)	1.2	17.9	10.2	(9.8–10.6)	4.0[§]	64.5	46.6
>High school	6.7	(6.5–6.9)	Ref.	Ref.	6.2	(6.0–6.4)	Ref.	Ref.	Ref.
Poverty to income ratio**									
Poor, <1.0	10.7	(9.9 –11.5)	5.1[§]	91.1	11.2	(10.6–11.8)	5.8[§]	107.4	16.3
Near poor, 1.0–1.9	12.1	(11.3–12.9)	6.5[§]	116.1	9.3	(9.1–9.7)	3.9[§]	72.2[¶]	–43.9[¶]
Middle income, 2.0–3.9	6.9	(6.3–7.5)	1.3[§]	23.2	9.9	(9.5 –10.3)	4.5[§]	83.3§	60.1[¶]
High income, ≥4.0	5.6	(5.2–6.0)	Ref.	Ref.	5.4	(5.2–5.6)	Ref.	Ref.	Ref.
Disability status									
Disability	12.4	(11.8–13.0)	7.0[§]	129.6	14.9	(14.3–15.5)	10.4[§]	233.3[¶]	103.7[¶]
No disability	5.4	(5.2–5.6)	Ref.	Ref.	4.5	(4.3–4.7)	Ref.	Ref.	Ref.
Age group (yrs)[††]									
18–44	3.7	(3.5–3.9)	Ref.	Ref.	3.7	(3.5 –3.9)	Ref.	Ref.	Ref.
45–64	12.2	(11.6–12.8)	8.5[§]	229.7	14.7	(14.1–15.3)	11.0[§]	297.3[¶]	67.6[¶]
65–79	13.4	(12.8–14.0)	9.7[§]	262.2	13.5	(12.7–14.3)	9.8[§]	264.9	2.7
U.S. Census region									
Northeast	6.0	(5.8–6.2)	–0.4	6.3	9.5	(9.1–9.9)	2.3	31.9	25.6
Midwest	7.1	(6.9–7.3)	0.7	10.9	8.2	(8.0–8.4)	1.0	13.9	3.0
South	9.4	(9.2–9.6)	3.0	46.9	8.7	(8.5–8.9)	1.5	20.8	–26.1
West	6.4	(6.2–6.6)	Ref.	Ref.	7.2	(7.0–7.4)	Ref.	Ref.	Ref.

Abbreviation: CI = confidence interval.

* Per 1,000 population.

[†] Persons of Hispanic ethnicity might be of any race.

[§] Difference between group estimate and reference group estimate significant at p<0.05 by z statistic and a two-tailed test with Bonferroni correction.

[¶] Difference between the group relative differences in 2008 and 2004 significant at p<0.05 by z statistic and a two-tailed test with Bonferroni correction.

** On the basis of the U.S. poverty level.

[††] Age-specific estimates are not age adjusted.

incidence rates of diagnosed diabetes among the poor, near-poor, and middle income PIR categories and the incidence rate in the referent category (high income, PIR ≥4.0) were also significantly different. In addition, the absolute disparities in the age-standardized incidence rate of diagnosed diabetes increased progressively with decreasing levels of education and PIR; these disparities increased to >100% for the groups who did not complete high school or who lived below the federal poverty level (PIR < 1.0). The absolute disparities between the age-standardized incidence rates of diagnosed diabetes for adults aged 45–64 and 65–79 years and the rate among those aged 18–44 years were significant and increased with age, reflecting the age-related increased risk for diabetes (*1,6*). Finally, the incidence rate of diagnosed diabetes among the group with disabilities was significantly different from the rate in the group without disabilities. The relative disparities in incidence rates demonstrated similar patterning.

Socioeconomic, age, and disability disparities in the incidence rate of diagnosed diabetes increased from 2004 to 2008 (Table 2). The relative disparities in the age-standardized incidence rates of diagnosed diabetes among the groups who had a high school education or less increased more than twofold and threefold, respectively, from 2004 to 2008 ($p<0.05$ for both groups). The change was less consistent for the groups by income. The relative disparities for the lowest income group (PIR < 1.0) were not significantly different; however, relative disparities among the near-poor and middle income groups were more than threefold higher during 2008 than 2004 ($p<0.05$ for both groups). In 2008, the relative disparity for the group with disabilities was approximately twice the relative disparity during 2004 ($p<0.05$).

The findings in this report are subject to at least two limitations. First, all data are self-reported and therefore subject to recall and social desirability bias. However, self-reported diabetes data have been reported to have high reliability (*15,16*). Second, differences were not assessed for total prevalence of diabetes (i.e., diagnosed and undiagnosed); therefore, the findings might underestimate the extent of the disparities in prevalence and incidence among the U.S. population. The percentage of persons with undiagnosed diabetes is estimated to range from 24% to 40% of the total prevalence of diabetes (*11,17*). However, the racial/ethnic, socioeconomic, geographic, disability, and change over time of the disparities in prevalence and incidence of medically diagnosed diabetes are consistent with reports on diabetes risk among U.S. adults (*1,4–6,12,13*).

Marked sociodemographic disparities in prevalence and incidence of diagnosed diabetes exist among U.S. adults. Moreover, no evidence indicates that racial/ethnic disparities in prevalence and incidence of diagnosed diabetes decreased from 2004 to 2008, although socioeconomic disparities worsened during the same interval. Health promotion and risk-reduction efforts have been focused primarily on racial/ethnic minority groups identified as groups at high risk for diabetes. The findings in this report demonstrate that, despite these efforts, decreases in racial/ethnic disparities have been substantially limited. Increased awareness about the risk for diabetes among adults with low levels of income and educational attainment and those with disabilities might help decrease disparities. Interventions designed specifically for these groups might increase the effectiveness of efforts to reduce disparities in diabetes risk.

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Prevalence of Hypertension and Controlled Hypertension — United States, 2005–2008

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Hypertension is a serious public health challenge in the United States, affecting approximately 30% of adults (*1,2*) and increasing the risk for heart disease and stroke, the first and third leading causes of death in the United States* (*3*). Racial/ethnic and socioeconomic disparities in hypertension prevalence in the United States have been documented for decades (*4*). Non-Hispanic blacks have a higher risk for hypertension and hypertension-related complications (e.g., stroke, diabetes, and chronic kidney disease) than non-Hispanic whites and Mexican Americans (*2,4*). Between 1999–2000 and 2007–2008, the prevalence of hypertension did not change, but control of hypertension increased among those with hypertension (*1,5*). Despite considerable improvements in increasing awareness, treatment and control of hypertension, in 2007–2008, approximately half of adults with hypertension did not have their blood pressure under control (*1*). Because of the fundamental role of hypertension in cardiovascular health, *Healthy People 2010* includes national objectives to reduce the proportion of adults aged ≥20 years with hypertension to 14% from a baseline of 26% (objective 12-9) and to increase the proportion of adults aged ≥18 years with hypertension whose blood pressure is under control to 68% from a baseline of 25% (objective 12-10) (*6,7*).

To estimate age-adjusted hypertension prevalence and control among persons aged ≥18 years, CDC analyzed combined National Health and Nutrition Examination Survey (NHANES) data from two survey periods: 2005–2006 and 2007–2008.† NHANES is a nationally representative survey of the noninstitutionalized U.S. civilian population. Data are collected annually but released in 2-year cycles. NHANES includes a home interview and a physical examination at a mobile examination center where blood pressure is measured. Participants were selected through a complex, multistage sampling probability design. During 2005–2008, the response rate among persons in the sample was 76.4%.§ Data were analyzed for 10,488 participants for whom adequate interview and examination data were collected to determine hypertension status.

Blood pressure is measured by averaging two or three blood pressure readings taken during the physical examination in the NHANES mobile examination center. A detailed description of the procedures for blood pressure measurement in NHANES has been published elsewhere (*8*). Adults are categorized as having hypertension if they have a systolic blood pressure (SBP) ≥140 mm Hg, have a diastolic blood pressure (DBP) ≥90 mm Hg, or report that they are taking high blood pressure medication (*9*). Controlled hypertension is defined as SBP <140 mm Hg and DBP <90 mm Hg among persons with hypertension. Pregnant women were excluded from all analyses. Hypertension prevalence and control estimates were analyzed by demographic factors (i.e., sex, age group, race/ethnicity, marital status, education level, foreign-born status, family income,¶ health insurance status,** veteran status, and disability††) and health factors (i.e., diabetes§§ and obesity¶¶).

Statistical analyses accounted for the complex survey design and were age adjusted to the 2000 U.S. standard population. Univariate t-tests were used to assess significant differences between groups. Trend tests were used to evaluate associations with age, education, and income. All significance tests were two-sided, with $p<0.05$ as the level of statistical significance. For comparison of estimates by variables with more than two categories, adjustments for multiple comparisons were made using the Bonferroni method by dividing 0.05 by the number of comparisons (*10*).

The overall age-adjusted prevalence of hypertension among persons aged ≥18 years for 2005–2008 was 29.9%. Substantial differences (>10%) in hypertension by age group, race/ethnicity, education, family income, foreign-born status, health insurance status, diabetes, obesity, and disability status were evident during 2005–2008 (Table). Although differences in hypertension preva-

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* Preliminary data for 2008 indicate that stroke might now be the fourth leading cause of death in the United States. However, these data should be interpreted with caution. (Data available at http://www.cdc.gov/nchs/data/nvsr/nvsr59/nvsr59_02.pdf.)

† Additional information is available at http://www.cdc.gov/nchs/nhanes.htm.

§ The response rate is the percentage of persons who were examined among all sampled persons.

¶ Family income: the combined income of all persons within a household who are related to each other by blood, marriage, or adoption. Poverty level: family income relative to family size and age of the members adjusted for inflation using the poverty thresholds developed by the U.S. Bureau of the Census.

** Private health insurance: private health insurance or Medigap insurance. Public health insurance: Medicare, Medicaid, State Children's Health Insurance Program, military health care, state-sponsored health plan, or other government insurance.

†† Disability: the inability to work at a job or business because of a physical, mental, or emotional problem; limitation caused by difficulty remembering or periods of confusion; limitation in any activity because of a physical, mental, or emotional problem; or use of special equipment (e.g., cane, wheelchair, special bed, or special telephone).

§§ Persons with diabetes: those who have ever been told by a health-care professional that they have diabetes. Persons without diabetes: those who have never been told by a health-care professional that they have diabetes or have never been told that they have borderline diabetes.

¶¶ Obesity: body mass index ≥30 kg/m^2 based on measured weight and height.

TABLE. Age-adjusted percentage[*] of hypertension and controlled hypertension among adults aged ≥18 years, by selected demographic and health characteristics — National Health and Nutrition Examination Survey, United States, 2005–2008

	Hypertension[†]		Controlled hypertension[§]	
Characteristic	**%**	**(95% CI)**	**%**	**(95% CI)**
Sex				
Male	30.6	(29.0–32.3)[¶]	38.6	(34.6–42.6)[¶]
Female (referent)	28.7	(27.5–30.0)	52.0	(48.7–55.3)
Age group (yrs), unadjusted[**]				
18–44 (referent)	10.5	(9.0–11.9)	37.5	(31.2–43.7)
45–64	40.6	(38.1–43.2)[¶]	48.9	(45.4–52.3)[¶]
≥65	70.3	(67.5–73.2)[¶]	45.6	(42.9–48.4)
Race/Ethnicity				
Mexican American	25.5	(23.4–27.7)[¶]	31.8	(26.1–37.6)[¶]
Black, non-Hispanic	42.0	(39.6–44.3)[¶]	41.2	(37.4–44.9)
White, non-Hispanic (referent)	28.8	(27.1–30.4)	46.5	(42.9–50.1)
Marital status (persons aged ≥20 yrs)				
Never married	34.7	(30.8–38.6)	36.5	(30.0–43.0)
Married/living with partner (referent)	30.0	(28.6–31.5)	44.9	(41.1–48.7)
Divorced or separated/widowed	33.0	(30.6–35.3)[¶]	47.6	(40.0–55.2)
Education (persons aged ≥25 yrs)[**]				
<High school	37.3	(34.6–40.0)[¶]	36.5	(27.8–45.1)
High school graduate	35.9	(33.8–38.0)[¶]	47.2	(41.7–52.7)
Some college	33.6	(31.5–35.8)[¶]	44.6	(39.4–49.9)
College graduate or above (referent)	29.6	(27.5–31.6)	50.2	(43.5–56.9)
Foreign-born status				
Born in United States (referent)	30.8	(29.4–32.1)	45.2	(41.9–48.5)
Born outside United States	24.9	(23.1–26.7)[¶]	31.5	(25.0–38.0)[¶]
Family income, U.S. poverty level,[††] (%)				
<100	32.6	(30.4–34.8)[¶]	42.4	(33.2–51.5)
100–199	32.7	(30.3–35.0)[¶]	37.3	(30.0–44.6)
200–399	30.8	(28.6–33.1)	45.2	(39.8–50.6)
400–499	28.6	(25.0–32.2)	44.5	(34.0–55.0)
≥500 (referent)	27.4	(24.9–29.8)	47.9	(41.9–53.8)
Health insurance status (age ≤64 yrs)[,§§]**				
Insured	21.8	(20.2–23.5)	47.6	(43.9–51.3)[¶]
Private insurance	20.2	(18.5–21.9)	45.4	(41.7–49.0)[¶]
Public insurance	32.1	(29.2–35.0)[¶]	55.5	(45.8–65.2)[¶]
Uninsured (referent)	20.0	(18.0–22.0)	26.4	(19.1–33.7)
Veteran status				
Yes	30.6	(27.6–33.6)	43.1	(34.1–52.0)
No (referent)	29.8	(28.6–31.0)	43.6	(40.2–46.9)
Diabetes[¶¶]				
Yes	57.3	(52.2–62.4)[¶]	56.9	(48.9–64.9)[¶]
No (referent)	28.6	(27.4–29.7)	41.7	(38.8–44.6)
Obesity[***]				
Yes	39.8	(37.9–41.7)[¶]	47.5	(43.5–51.6)[¶]
No (referent)	25.8	(24.6–27.0)	39.8	(36.5–43.1)
Disability[†††]				
Yes	39.3	(36.5–42.1)[¶]	54.1	(47.4–60.8)[¶]
No (referent)	29.3	(27.9–30.6)	41.1	(38.0–44.1)
Total	**29.9**	**(28.6–31.1)**	**43.7**	**(40.7–46.7)**

Abbreviation: CI = confidence interval.

[*] Age adjusted to the 2000 U.S. standard population. Hypertension is age adjusted to the following seven age groups: 18–29, 30–39, 40–49, 50–59, 60–69, 70–79, and ≥80 yrs. Hypertension control and data by diabetes status are age adjusted to the following five age groups: 18–49, 50–59, 60–69, 70–79, and ≥80 yrs.

[†] Systolic blood pressure (SBP) ≥140 mm Hg, diastolic blood pressure (DBP) ≥90 mm Hg, or taking high blood pressure medicine.

[§] SBP <140 mm Hg and DBP <90 mm Hg among persons with hypertension.

[¶] p<0.05 compared with the referent group, with Bonferroni adjustment for variables with more than two categories.

[**] p<0.05, test of trend for hypertension prevalence; not significant for controlled hypertension.

[††] Family income: income of all persons within a household who are related to each other by blood, marriage, or adoption. Poverty level: family income relative to family size and age of the members adjusted for inflation by using the poverty thresholds developed by the U.S. Bureau of the Census.

[§§] Private health insurance: private health insurance or Medigap insurance. Public health insurance: Medicare, Medicaid, State Children's Health Insurance Program, military health care, state-sponsored health plan, or other government insurance.

[¶¶] Persons with diabetes: those who have ever been told by a health-care professional that they have diabetes. Persons without diabetes: those who have never been told by a health-care professional that they have diabetes or have never been told that they have borderline diabetes.

[***] Obesity: body mass index ≥30 kg/m2 based on measured weight and height.

[†††] Disability: inability to work at a job or business because of a physical, mental, or emotional problem; limitation caused by difficulty remembering or periods of confusion; limitation in any activity because of a physical, mental, or emotional problem; or use of special equipment (e.g., a cane, a wheelchair, a special bed, or a special telephone).

lence by marital status and sex were also statistically significant, the differences were ≤10%. Hypertension prevalence increased with age and decreased with increasing education and income level. Non-Hispanic blacks had higher levels of hypertension (42.0%) than non-Hispanic whites (28.8%) and Mexican Americans (25.5%). U.S.-born adults had higher levels of hypertension (30.8%) than foreign-born adults (24.9%). Persons with diabetes had a significantly higher prevalence of hypertension than those without diabetes (57.3% versus 28.6%), as did those who were obese compared with those who were not (39.8% versus 25.8%) and those with a disability compared with those with no disability (39.3% versus 29.3%). Adults aged <65 years with public insurance had higher levels of hypertension (32.1%) than those with private insurance (20.2%) and those with no insurance (20.0%).

During 2005–2008, the overall age-adjusted prevalence of hypertension control among persons with hypertension aged ≥18 years was 43.7% (Table). Men, adults aged 18–44 years, Mexican Americans, foreign-born, and persons without health insurance had a lower prevalence of hypertension control than their counterparts. Adults aged 18–44 years (37.5%) had a lower rate of hypertension control than adults aged 45–64 years (48.9%). The proportion of controlled blood pressure was similar among non-Hispanic blacks (41.2%) and non-Hispanic whites (46.5%) but was substantially lower among Mexican Americans (31.8%). Controlled hypertension was also lower among those classified as not obese compared with those who were obese (39.8% versus 47.5%), persons without diabetes compared with those with diabetes (41.7% versus 56.9%), and persons with no disability compared with those with a disability (41.1% versus 54.1%). Controlled hypertension was not associated with education or income.

The findings in this report are subject to at least four limitations. First, NHANES data are restricted to the noninstitutionalized population; thus, results from this study are not generalizable to persons who live in nursing homes or prisons or to military personnel. Second, reliable data were not available for certain racial/ethnic groups or sexual orientation. Only non-Hispanic blacks and Mexican Americans were oversampled; consequently, estimates cannot be calculated for other racial/ethnic populations (e.g., American Indians/Alaska Natives [AI/ANs], Asians/Native Hawaiians/other Pacific Islanders [A/PIs], or other Hispanics). Third, the cross-sectional study design provides a one-time only assessment of blood pressure, even though the blood pressure might be measured multiple times during one visit. This one-time assessment can overestimate or underestimate hypertension prevalence. However, the standardized measurement of blood pressure in a mobile examination center makes NHANES the best source of national data on hypertension. Finally, this study does not examine time trends in disparities to assess progress towards eliminating disparities. Although other studies included time trends, only a limited number of demographic characteristics such as race/ethnicity, age, and sex were examined (*1,5*).

These findings highlight the need for 1) expanded surveillance efforts to provide more data within populations, particularly for those most at risk for hypertension (i.e., persons with prehypertension, all blacks, and adults aged ≥45 years) and 2) augmented population-based strategies to prevent and control hypertension, particularly for those most at risk for hypertension-related cardiovascular disease (i.e., adults aged ≥65 years, blacks, and persons with hypertension, diabetes, or chronic kidney disease). The American Heart Association recommends such strategies in the *Guide for Improving Cardiovascular Health at the Community Level* (*11*), which uses the evidence-based recommendtions for single health behaviors at the community level from The Task Force on Community Preventive Services. Strategies include those related to assessment, education, community organization and partnering, ensuring personal health services, environmental change, and policy change. Specific recommendations include tracking blood pressure levels and identifying groups at high risk for hypertension; raising awareness about the importance of hypertension prevention and control in the prevention of cardiovascular disease and stroke; and promoting healthy lifestyle changes through education in the community, classroom, and work sites with tailored materials to accommodate for limited literacy and for culture and language diversity as well as improved access to healthy foods and places to exercise.

Uncontrolled hypertension contributes to premature death (death before age 75 years) from heart disease and stroke. In 2006, the age-adjusted years of potential life lost (YPLLs) for heart disease per 100,000 population aged <75 years were higher for blacks (1,969 YPLLs) and AI/ANs (1,009) than for whites (986), Hispanics (687), and A/PIs (472) (*12*). Blacks also had the highest YPLLs for stroke (432), compared with Hispanics (185), AI/ANs (178), A/PIs (164), and whites (158).

To prevent and control hypertension, the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7) recommends lifestyle modifications, including maintaining a healthy body weight; adopting a diet rich in fruits, vegetables, and low-fat dairy products with reduced levels of saturated and total fat; reducing sodium intake; participating in regular aerobic physical activity; and limiting alcohol consumption (no more than two drinks per day for men and one drink per day for women). For hypertension control, JNC 7 also provides treatment guidelines for antihypertensive medications (*9*). One recommendation, reducing salt intake, has considerable potential for preventing and controlling hypertension. On the basis of predictive modeling of the health benefits of reduced salt intake on blood pressure, a populationwide reduction in sodium of 1,200 mg/day can reduce the annual number of new cases of coronary heart disease by 60,000–120,000 cases and stroke by 32,000–66,000 cases (*13*). The *Dietary Guidelines for Americans 2005* used evidence from clinical trials about hypertension and salt sensitivity (*14*) to recommend that specific groups (e.g., persons with hypertension, all middle-aged and older adults, and blacks) limit sodium intake to 1,500 mg/day (*15*). The specific groups comprise approximately 70% of the U.S. population (*16*). On the basis of 2005–2006 NHANES data, the average sodium intake is 3,466 mg/day, and only 9.6% of all adults did not exceed their applicable recommended limit of sodium (*17*). In 2010, the Institute of Medicine published recommendations for reducing sodium consumption, including a recommendation for mandatory national standards for the sodium content of foods, an interim strategy of voluntary action, and a series of supporting strategies, which includes ensuring and enhancing sodium-related monitoring (*18*). In one such strategy, New York City, in a partnership of cities, states, and national health organizations, set voluntary benchmarks for lowering the average sodium level in 62 categories of packaged food and 25 categories of restaurant food. Sixteen companies have committed to meeting at least one target for packaged or restaurant food within 2–4 years.***

Another IOM report published in 2010 recommended a population-based policy and systems change approach to prevent and control hypertension rather than interventions designed for individuals directly (*19*). For example, policy and system changes could help persons with hypertension by ensuring that they are receiving care consistent with current guidelines and receiving effective antihypertensive medication if needed. An action plan for making home blood pressure monitoring (HBPM) a part of routine management of hypertensive patients includes the recommendation that patients be reimbursed for a monitor and that their health care provider be reimbursed for services related to patients using HBPM (*20*). A systematic review of interventions assessing health risks with feedback to change employees' health reviewed 31 studies that included blood pressure assessment plus health education with or without other interventions (*21*). The authors concluded that the results were in favor of such interventions.

CDC will continue to monitor progress in achieving *Healthy People* hypertension-related objectives to provide national data for program planning and as a basis for action when progress is not achieved or worsens. In addition, progress should be monitored within demographic groups most at risk for hypertension and hypertension-related morbidity and mortality, the groups who are also most in need of population-based strategies to reduce sodium in foods.

*** Additional information is available at http://www.nyc.gov/html/doh/html/cardio/cardio-salt-initiative-comp-commitments.shtml.

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Health Outcomes

Behavioral Risk Factors

Binge Drinking — United States, 2009

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Excessive alcohol use is the third leading preventable cause of death in the United States (*1*) and was responsible for approximately 79,000 deaths and 2.3 million years of potential life lost (YPLL) in the United States each year during 2001–2005.* Binge drinking, defined as consuming four or more alcoholic drinks on one or more occasion for women and five or more drinks on one or more occasion for men, was responsible for more than half of these deaths and for two thirds of YPLL (*2*). More than half of alcohol consumed by adults in the United States is in the form of binge drinks (*3*). *Healthy People 2010* (HP2010) (objective no. 26-11c) called for reducing the prevalence of binge drinking among adults (*4*). An overarching national health goal is to eliminate health disparities among different segments of the population.

To assess binge drinking by sex, age group, race/ethnicity, education level, income level, and disability status at the individual level, as well as geographic disparities in binge drinking at the state level, CDC analyzed data from the 2009 Behavioral Risk Factor Surveillance System (BRFSS) on binge drinking prevalence, frequency (i.e., the average number of binge drinking episodes), and intensity (i.e., the average largest number of drinks consumed by binge drinkers).

BRFSS is a state-based, random-digit–dialed telephone survey of the noninstitutionalized U.S. civilian population aged ≥18 years that is conducted monthly in all states and selected territories. BRFSS includes data regarding leading health conditions and health risk behaviors, including binge drinking. For this report, responses to questions regarding the prevalence, frequency, and largest number of drinks consumed by binge drinkers (a measure of the intensity of binge drinking) were analyzed, beginning with the question, "Considering all types of alcoholic beverages, how many times during the past 30 days did you have X [X = 5 for men; X = 4 for women] or more drinks on an occasion?" Respondents then were asked, "During the past 30 days, what is the largest number of drinks you had on any occasion?" Responses to this question were assessed for binge drinkers only. After exclusion of persons who reported "don't know/not sure" or "refused" and those with missing information and respondents from the U.S territories, data from 408,845 respondents in the 50 states and the District of Columbia (DC) were used for analysis. Response rates for each state were calculated by using the Council of American Survey and Research Organizations (CASRO) guidelines. Response rates ranged from 37.9% (Oregon) to 66.9% (Nebraska) (median: 52.5%), and cooperation rates ranged from 55.5% (California) to 88.0% (Kentucky) (median: 75.0%).†

Binge drinking prevalence was calculated by dividing the total number of respondents who reported at least one binge drinking episode during the preceding 30 days by the total number of BRFSS respondents in all 50 states and DC. Frequency of binge drinking (i.e., the number of binge drinking episodes) was calculated by averaging the number of episodes reported by all binge drinkers during the preceding 30 days. Intensity of binge drinking was calculated by averaging the largest number of drinks consumed by binge drinkers during the past 30 days. All data were weighted to produce population-based estimates according to age-, race-, and sex-specific state population counts and to the respondent's probability of selection. Data were age- and sex-adjusted to the 2000 U.S. census standard population to provide estimates for race/ethnicity, education level, annual household income level, disability status, and state poverty level. Sexual orientation and racial/ethnic subgroups (e.g., the wide variation in the Hispanic population) were not assessed because this information is not collected in BRFSS. Two-tailed t-tests were used to determine differences between subgroups. Differences between prevalence estimates were considered statistically significant if the t-test p value was <0.05.

In 2009, the overall prevalence of binge drinking among adults in the 50 states and DC was 15.2% (Table 1). Binge drinking prevalence among men (20.8%) was two times higher than among women (10.0%). Men who reported binge drinking also reported a higher average number of binge drinking episodes during the preceding 30 days (4.6) than women (3.1) and the average largest number of drinks consumed (8.5 versus 5.7, respectively). Binge drinking prevalence decreased with increasing age, from 25.6% among respondents aged 18–24 years to 3.8% among respondents aged ≥65 years. However, binge drinkers aged ≥65 years reported the highest average number of binge drinking episodes during the preceding 30 days (5.4). The average largest number of drinks consumed by binge drinkers decreased with increasing age, from 9.1 among adults aged 18–24 years to 5.5 among those aged ≥65 years.

The age- and sex-adjusted prevalence of binge drinking among non-Hispanic whites (17.5%) was similar to the prevalence among American Indians/Alaska Natives (AI/ANs) (15.4%), but significantly higher ($p<0.0001$) than the prevalence for Hispanics (14.4%),

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* Data available at https://apps.nccd.cdc.gov/ardi/Homepage.aspx.

† The response rate is the percentage of persons who completed interviews among all eligible persons, including those who were not contacted successfully. The cooperation rate is the percentage of persons who completed interviews among all eligible persons who were contacted.

TABLE 1. Unadjusted binge drinking prevalence, frequency, and intensity, by sex and age group — Behavioral Risk Factor Surveillance System,* United States, 2009

	Prevalence			Frequency†			Intensity§		
Sex/Age group	**No.**	**Weighted %**	**(95% CI)**	**No.**	**No. of episodes**	**(95% CI)**	**No.**	**No. of drinks**	**(95% CI)**
Sex									
Men	154,834	20.8	(20.3–21.2)	25,212	4.6	(4.4–4.7)	23,409	8.5	(8.4–8.7)
Women	254,011	10.0	(9.7–10.2)	18,703	3.1	(3.0–3.2)	17,687	5.7	(5.6–5.8)
Age group (yrs)									
18–24	12,312	25.6	(24.2–26.9)	2,950	4.1	(3.8–4.4)	2,713	9.1	(8.6–9.5)
25–34	35,441	22.5	(21.7–23.3)	7,415	3.9	(3.7–4.1)	6,983	8.0	(7.8–8.2)
35–44	57,057	17.8	(17.2–18.4)	9,891	3.9	(3.7–4.1)	9,375	7.3	(7.1–7.4)
45–64	173,869	12.1	(11.8–12.4)	19,464	4.2	(4.1–4.4)	18,233	6.5	(6.4–6.6)
≥65	130,166	3.8	(3.6–4.0)	4,195	5.4	(4.8–6.0)	3,792	5.5	(5.3–5.6)
Total	**408,845**	**15.2**	**(15.0–15.5)**	**43,915**	**4.1**	**(4.0–4.2)**	**41,096**	**7.5**	**(7.4–7.7)**

Abbreviation: CI = confidence interval.

* Respondents were from all 50 states and the District of Columbia.

† Average number of binge-drinking episodes.

§ Average largest number of drinks consumed by binge drinkers on any occasion.

non-Hispanic blacks (10.4%), and Asians/Native Hawaiians/Pacific Islanders (7.8%) (Table 2). Overall, the average number of binge drinking episodes was similar across racial/ethnic groups. However, the average largest number of drinks consumed by binge drinkers (8.4) was reported by AI/ANs.

Respondents who did not graduate from high school reported the lowest binge drinking prevalence (12.5%). However, non-high school graduates who reported binge drinking had the highest average frequency of binge drinking episodes (4.9) and the average largest number of drinks consumed (7.8). In contrast, binge drinking prevalence increased with income level and was highest among respondents with annual household incomes ≥$50,000 (18.5%). However, binge drinkers with household incomes ≥$50,000 reported a significantly lower average number of binge drinking episodes (3.6) and a lower average largest number of drinks consumed (6.5) than those with household incomes <$50,000. Respondents with disabilities had a significantly lower prevalence of binge drinking (14.3%) but a higher average frequency of binge drinking episodes (4.6) and average largest number of drinks consumed (7.2), compared with those without disabilities (Table 2). During 1993–2009, the greatest increase ($p<0.0001$) in the prevalence of binge drinking occurred among non-Hispanic whites (from 14.8% to 17.5%), college graduates (from 13.5% to 17.4%), and respondents with annual household incomes ≥$50,000 (from 13.4% to 18.5%). Binge drinking prevalence also was significantly higher ($p<0.0001$) in wealthier states (i.e., those with the lowest proportion of their population living below the federal poverty level) than in poorer states (17.6% and 13.9%, respectively) (Table 3).

Binge drinking is a risk factor for multiple adverse health and social outcomes, including unintentional injuries (e.g., motor-vehicle crashes), violence, suicide, hypertension, acute myocardial infarction, sexually transmitted diseases, unintended pregnancy, fetal alcohol syndrome, and sudden infant death syndrome (*5*). This report indicates that binge drinking is common among U.S. adults, especially among whites, males, persons aged 18–34 years, and those with household incomes ≥$50,000. These sociodemographic characteristics are in contrast with characteristics for other health risks (e.g., smoking and obesity), for which prevalence tends to be higher among racial/ethnic minorities and persons with lower education and income (*6*).

The findings in this report also highlight the need for assessing both the frequency and intensity of binge drinking among binge drinkers and the prevalence of binge drinking among the general population. These additional measures are important because the risk for adverse outcomes (e.g., alcoholic liver disease or traffic fatalities) increases with the frequency of binge drinking and with the amount consumed per binge drinking episode (*7*). Furthermore, reductions in the frequency and intensity of binge drinking might be expected to occur before reductions in binge drinking prevalence (*7,8*); thus, these measures serve as key indicators of progress toward achieving overall reductions in binge drinking.

One possible reason why binge drinking is more prevalent among whites and persons at higher income levels is that, unlike smoking, binge drinking has not been recognized widely as a health risk or subjected to intense prevention efforts (*3*). The differences in binge drinking among population groups also probably reflects cultural factors (*9*) and differences in state and local laws (*10*) that affect the price, availability, and marketing of alcoholic beverages.

The findings in this report are subject to at least four limitations. First, BRFSS data are self-reported; alcohol consumption generally, and excessive drinking in particular, are underreported in surveys because of recall bias and social desirability bias (*11*). A recent study reported that the BRFSS identifies only 22%–32% of presumed alcohol consumption in states on the basis of alcohol sales (*12*). Second, response rates for BRFSS were low, which increased the risk for response bias. Third, BRFSS does not collect information from persons living in institutional settings (e.g., on college campuses), and so data might not be representative of those populations. Fourth, BRFSS is conducted primarily by using landline telephones, and previous studies have indicated that an increasing proportion of youths and young adults aged 18–34 years use cellular phones exclusively and that the prevalence of binge drinking is approxi-

TABLE 2. Age- and sex-adjusted[*] binge-drinking prevalence, frequency, and intensity, by race/ethnicity, education level, annual household income, and disability status — Behavioral Risk Factor Surveillance System,[†] United States, 2009

	Prevalence			Frequency[§]			Intensity[¶]		
Characteristic	**No.**	**Weighted %**	**(95% CI)**	**No.**	**No. of episodes**	**(95% CI)**	**No.**	**No. of drinks**	**(95% CI)**
Race/Ethnicity									
White, non-Hispanic	327,620	17.5	(17.2–17.8)	36,092	3.9	(3.8–4.0)	33,934	6.7	(6.6–6.8)
Black, non-Hispanic	31,358	10.4	(9.6–11.2)	2,386	3.8	(3.5–4.2)	2,121	6.1	(5.8–6.3)
Hispanic	24,218	14.4	(13.5–15.2)	2,742	3.8	(3.4–4.3)	2,552	6.5	(6.3–6.8)
A/NH/PI, non-Hispanic	7,288	7.8	(6.6–9.0)	572	3.4	(2.7–4.1)	545	5.6	(5.2–6.0)
AI/AN,non-Hispanic	5,671	15.4	(13.1–17.6)	763	6.7	(3.9–9.6)	687	8.4	(7.5–9.2)
Education level									
Less than high school	37,575	12.5	(11.6–13.4)	2,776	4.9	(4.4–5.5)	2,486	7.8	(7.3–8.2)
High school diploma[**]	122,113	15.5	(15.0–16.0)	12,661	4.5	(4.3–4.7)	11,690	7.1	(6.9–7.2)
Some college	110,146	16.6	(16.0–17.1)	12,491	4.1	(3.9–4.3)	11,699	6.7	(6.6–6.8)
College graduate	138,374	17.4	(16.7–18.0)	15,959	3.2	(3.1–3.3)	15,199	6.1	(6.0–6.2)
Annual household income ($)									
≤14,999	39,620	12.1	(11.2–13.0)	2,809	4.9	(4.3–5.5)	2,563	7.1	(6.8–7.5)
15,000–≤24,999	62,787	13.3	(12.6–14.0)	5,070	4.5	(4.2–4.9)	4,687	6.9	(6.7–7.2)
25,000–≤34,999	43,448	15.5	(14.6–16.5)	4,058	4.2	(3.9–4.5)	3,786	7.0	(6.7–7.2)
35,000–≤49,999	55,450	15.5	(14.7–16.3)	6,036	4.2	(4.0–4.5)	5,673	6.8	(6.7–7.0)
≥50,000	156,408	18.5	(18.0–19.0)	22,936	3.6	(3.5–3.8)	21,857	6.5	(6.4–6.5)
Disability status									
Yes	100,318	14.3	(13.4–15.1)	7,058	4.6	(4.3–5.0)	6,530	7.2	(7.0–7.4)
No	306,723	16.0	(15.7–16.3)	36,745	3.8	(3.7–3.9)	34,466	6.6	(6.5–6.6)

Abbreviations: CI = confidence interval; A/NH/PI = Asians/Native Hawaiians/Pacific Islanders; AI/AN = American Indians/Alaska Natives.

[*] Age- and sex-adjusted to the 2000 U.S. Census standard population.

[†] Respondents were from all 50 states and the District of Columbia.

[§] Average number of binge-drinking episodes.

[¶] Average largest number of drinks consumed by binge drinkers on any occasion.

[**] Includes General Education Diploma.

TABLE 3. Geographic disparities in binge-drinking prevalence, by quartile (Q1–Q4) of state poverty level — Behavioral Risk Factor Surveillance System,[*] United States, 2009

	Binge drinking		
State level	**No.**	**Weighted %**	**(95% CI)**
Q1 (14.4%–19.3%)	108,902	13.9[†]	(13.4–14.3)
Q2 (12.9%–14.3%)	110,186	16.2[†]	(15.7–16.8)
Q3 (10.2%–12.8%)	112,542	16.8[†]	(16.2–17.3)
Q4 (≤10.1%)	77,215	17.6[†]	(17.0–18.1)
Total	**408,845**	**15.6[†]**	**(15.4–15.9)**

Abbreviation: CI = confidence interval.

[*] Respondents were from all 50 states and the District of Columbia.

[†] Age- and sex-adjusted to the 2000 U.S. Census standard population.

mately one third higher among cell phone users than among landline respondents to BRFSS (*13*). Therefore, binge drinking among persons in this age group is even more likely to be underestimated than in other age groups in BRFSS.

These findings support the need to implement such evidence-based population-level strategies to prevent binge drinking as those recommended by the Guide to Community Preventive Services (*14*): increasing alcohol excise taxes, regulating alcohol outlet density, and maintaining and enforcing age 21 years as the minimum legal drinking age. For example, a 10% increase in the price of alcoholic beverages as a result of an increase in alcohol excise taxes would be expected to reduce total alcohol consumption by 7%, and enhanced enforcement of the age 21 minimum legal drinking age could reduce retail sales to minors by 42%. Screening and counseling for alcohol misuse among adults, including binge drinking, also should be implemented as recommended by the U.S. Preventive Services Task Force (*15*). The frequency and intensity of binge drinking also should be monitored routinely to guide development and evaluation of culturally appropriate binge drinking prevention and intervention strategies for groups at greater risk.

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Adolescent Pregnancy and Childbirth — United States, 1991–2008

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Giving birth to a child during the adolescent years frequently is associated with long-term adverse consequences for the mother and her child (*1–3*) that often are attributable in part to fragile family structure and limited social support and financial resources. Compared with infants born to adult women, infants born to adolescent females are at elevated risk for preterm birth, low birth weight, or death during infancy (*4–6*). An estimated 82% of pregnancies in 2001 among adolescents were unintended (*7,8*).

To analyze trends and variations in adolescent pregnancy and birth rates, CDC analyzed birth data from the National Vital Statistics System (NVSS) for 1991–2008. Data for 1991–2007 are final; data for 2008 are preliminary (*4,6*). Data by maternal race/ethnicity are based on information reported by the mother during the birth registration process. Race and ethnicity are reported separately on birth certificates. Birth rates were calculated by using population estimates prepared by the U.S. Census Bureau. Percentage change over time was calculated by comparing the rates for the beginning and end points in each time period. In analyzing differences over time and among groups, only statistically significant differences are noted. Significance testing is based on the z-test at the 95% confidence level (*4,6*). Additional information is available elsewhere (*4,6*). Data regarding adolescent pregnancy are not as current or complete as NVSS data regarding adolescent births. Birth data are based on NVSS and are shared with CDC through the Vital Statistics Cooperative Program (VSCP). National data on adolescent pregnancy and childbirth according to such attributes as educational attainment and disability status are not available because this information is not collected consistently and completely in NVSS and the National Abortion Surveillance System. Abortion estimates are from abortion surveillance information collected from the majority of states by CDC; these estimates are adjusted to national totals by the Guttmacher Institute (*9*). Information on fetal losses is derived from the pregnancy history data collected from multiple cycles of the National Survey of Family Growth (NSFG), conducted by CDC's National Center for Health Statistics (*9*). The most recent pregnancy estimates that include data on live births, induced abortions, and fetal losses are for 2005 (*9*).

In 2005, on the basis of available data, approximately 57% of the estimated 740,000 adolescent pregnancies ended in a live birth, 27% ended in an induced abortion, and 16% ended in a fetal loss. Substantial differences exist by race/ethnicity in how adolescent pregnancies are resolved. Pregnancies among non-Hispanic white and Hispanic adolescents are more likely to end in live births and less likely to end in induced abortions than are pregnancies among non-Hispanic black adolescents.

In 2008, the U.S. birth rate for adolescents was 41.5 births per 1,000 females aged 15–19 years (*6*). Rates vary considerably by race and Hispanic origin. The rate for Hispanic adolescents (77.4 per 1,000 females aged 15–19 years) was approximately five times the rate for Asian/Pacific Islander (A/PI) adolescents (16.2), approximately three times the rate for non-Hispanic white adolescents (26.7) and somewhat higher than the rates for non-Hispanic black adolescents (62.9) and American Indian/Alaska Native (AI/AN) adolescents (58.4) (Table).

During 1991–2005, the birth rate for U.S. adolescents declined one third, from 61.8 per 1,000 females aged 15–19 years in 1991 to 40.5 in 2005. However, the long-term decline was interrupted in 2005–2007, when the adolescent birth rate increased 5%. Preliminary 2008 data indicate that the adolescent birth rate declined 2% during 2007– 2008.

Trends in birth rates by age group and race/ethnicity indicate that long-term declines during 1991–2005 were experienced by all populations but were somewhat greater for certain groups. During this period, birth rates among adolescents decreased the most (45%) for those aged 15–17 years. The rate for non-Hispanic black adolescents aged 15–17 years decreased 59% to an historic low of 34.9 per 1,000 population in 2005. The rate for Hispanic adolescents aged 15–17 years decreased 30% during 1991–2005, from 69.2 per 1,000 population in 1991 to 48.5 in 2005. Among females aged 18–19 years, the birth rate declined 26% during 1991–2005, and declines of ≥35% were recorded for non-Hispanic black and AI/AN adolescents aged 18–19 years. The increase in birth rates for adolescents aged 15–19 years during 2005–2007 was observed among the majority of racial/ethnic groups. The largest increase (13%) occurred among AI/AN adolescents. Rates for Hispanic adolescents were essentially the same during 2005 and 2007.

During 2007–2008, birth rates for adolescents aged 15–19 years decreased among all racial/ethnic groups. The decline for Hispanic adolescents brought their rate to the lowest ever reported for Hispanics, 77.4 per 1,000 female adolescents in 2008 (Table). Even with the apparent resumption of the decline in adolescent childbearing in 2008, the rate for the United States remains substantially higher than that for other industrialized countries (*10*).

The most recent adolescent birth data for different Hispanic groups and states are for 2007. Of note, among Hispanic adolescents, birth rates differ across the mother's national origin as well.

TABLE. Birth rates[*] for females aged 10–19 years, by age, race, and race/ethnicity of mother — National Vital Statistics System, United States, 1991, 2005–2007, and 2008 (preliminary data)

Characteristic	Year					Change 2007–2008 (%)	Change 2005–2007 (%)	Change 1991–2005 (%)
	2008[†]	2007	2006	2005	1991			
Age 10–14 years								
All race/ethnicity[§]	**0.6**	**0.6**	**0.6**	**0.7**	**1.4**	**0**	**-14[¶]**	**-50[¶]**
White, non-Hispanic[**]	0.2	0.2	0.2	0.2	0.5	0	0	-60[¶]
Black, non-Hispanic[**]	1.4	1.5	1.6	1.7	4.9	-7[¶]	-12[¶]	-65[¶]
American Indian/Alaska Native[**,††]	0.9	0.9	0.9	0.9	1.6	0	0	-44[¶]
Asian/Pacific Islander[**,††]	0.2	0.2	0.2	0.2	0.8	0	0	-75[¶]
All Hispanic[§§, ¶¶]	1.2	1.2	1.3	1.3	2.4	0	-8[¶]	-46[¶]
Mexican origin	NA[***]	1.3	1.4	1.4	2.5	NA	-7	-44[¶]
Puerto Rican origin	NA	0.9	1.0	1.0	2.7	NA	-10	-63[¶]
Age 15–19 years								
All race/ethnicity[§]	**41.5**	**42.5**	**41.9**	**40.5**	**61.8**	**-2[¶]**	**5[¶]**	**-34[¶]**
White, non-Hispanic[**]	26.7	27.2	26.6	25.9	43.4	-2[¶]	5[¶]	-40[¶]
Black, non-Hispanic[**]	62.9	64.2	63.7	60.9	118.2	-2[¶]	5[¶]	-48[¶]
American Indian/Alaska Native[**,††]	58.4	59.3	55.0	52.7	84.1	-2	13[¶]	-37[¶]
Asian/Pacific Islander[**,††]	16.2	16.9	17.0	17.0	27.3	-4[¶]	-1	-38[¶]
Hispanics[§§,¶¶]	77.4	81.8	83.0	81.7	104.6	-5[¶]	0	-22[¶]
Mexican origin	NA	88.7	92.9	93.4	108.3	NA	-5	-14
Puerto Rican origin	NA	67.1	69.3	63.3	111.0	NA	6	-43[¶]
Age 15–17 years								
All race/ethnicity[§]	**21.7**	**22.1**	**22.0**	**21.4**	**38.6**	**-2[¶]**	**3[¶]**	**-45[¶]**
White, non-Hispanic[**]	11.6	11.8	11.8	11.5	23.6	-2[¶]	3[¶]	-51[¶]
Black, non-Hispanic[**]	34.9	35.8	36.2	34.9	86.1	-3[¶]	3[¶]	-59[¶]
American Indian/Alaska Native[**,††]	32.5	31.8	30.7	30.5	51.9	2	4	-41[¶]
Asian/Pacific Islander[**,††]	8.0	8.2	8.8	8.2	16.3	-2	0	-50[¶]
All Hispanics[§§,¶¶]	46.1	47.9	47.9	48.5	69.2	-4[¶]	-1[¶]	-30[¶]
Mexican origin	NA	53.8	53.9	55.4	70.0	NA	-3	-21[¶]
Puerto Rican origin	NA	35.4	38.1	37.2	NA	NA	-5	NA
Age 18–19 years								
All race/ethnicity[§]	**70.7**	**73.9**	**73.0**	**69.9**	**94.0**	**-4[¶]**	**6[¶]**	**-26[¶]**
White, non-Hispanic[**]	48.6	50.4	49.3	48.0	70.6	-4[¶]	5[¶]	-32[¶]
Black, non-Hispanic[**]	104.7	109.3	108.4	103.0	162.2	-4[¶]	6[¶]	-36[¶]
American Indian/Alaska Native[**,††]	96.7	101.6	93.0	87.6	134.2	-5[¶]	16[¶]	-35[¶]
Asian/Pacific Islander[**,††]	28.4	29.9	29.5	30.1	42.2	-5[¶]	-1	-29[¶]
All Hispanics[§§,¶¶]	127.0	137.2	139.7	134.6	155.5	-7[¶]	2[¶]	-13[¶]
Mexican origin	NA	143.8	157.8	156.3	164.7	NA	-8	-5
Puerto Rican origin	NA	—[†††]	—	—	—	NA	—	—

[*] Rates are per 1,000 females in specified age group, race, and ethnicity. Reliable adolescent birth rates cannot be computed for Cuban- and other Hispanic-origin women because of the limited number of births reported.

[†] Data for 2008 are preliminary (*6*).

[§] Includes origin not stated.

[¶] Difference is statistically significant based on the z-test, at the 95% confidence level.

[**] Race and ethnicity are reported separately on birth certificates. Persons of Hispanic origin might be of any race. Racial categories are consistent with the 1977 White House Office of Management and Budget (OMB) standards. During 2008, a total of 30 states reported multirace data. The multirace data for these states were bridged to the single-race categories of the 1977 OMB standards for comparability with other states. Multiple-race reporting areas vary for 2005-2008. **Sources:** Martin JA, Hamilton BE, Sutton PD, et al. Births: final data for 2007. Hyattsville, MD: US Department of Health and Human Services, CDC, National Center for Health Statistics; 2010. National Vital Statistics Reports, Vol. 58, No. 24. Available at http://www.cdc.gov/nchs/data/nvsr/nvsr58/nvsr58_24.pdf. Hamilton BE, Martin JA, Ventura SJ. Births: preliminary data for 2008. Hyattsville, MD: US Department of Health and Human Services, CDC, National Center for Health Statistics; 2010. Nat Vital Stat Rep, Vol. 58, No. 16. Available at http://www.cdc.gov/nchs/data/nvsr/nvsr58/nvsr58_16.pdf.

[††] Data for persons of Hispanic origin are included in the data for each racial group, according to the mother's reported race.

[§§] Includes all persons of Hispanic origin of any race.

[¶¶] Includes mothers of Cuban, Central and South American, and other or unknown Hispanic origin.

[***] Data are unavailable.

[†††] Data do not meet standards of reliability or precision, on the basis of <20 births in the numerator or, for Hispanic-origin populations, <75,000 females in the denominator.

During 2007, although the overall rate for Hispanic adolescents was 81.8 births per 1,000 adolescent females, the rate for adolescent mothers of Mexican origin was 88.7 per 1,000 adolescent females, and the rate for adolescent mothers of Puerto Rican origin was 67.1 births per 1,000 adolescent females (Table) (*4,6*). Recent changes in birth rates for adolescent mothers of Mexican and Puerto Rican origin were not statistically significant. Because of limited cell numbers and fluctuations in population estimates, rates cannot be calculated routinely for adolescent mothers of Cuban origin; however, birth rates for adolescents of Cuban origin are relatively low (*11*).

A recent overview of adolescent birth rates illustrates widespread disparities by state and across population groups (*12*). Adolescent birth rates were consistently highest in the South and lowest in the Northeast and on the West Coast. These patterns persisted even when rates were examined within population groups. Birth rates for non-Hispanic white, non-Hispanic black, and Hispanic adolescents were uniformly high in the South and consistently low in the Northeast and on the West Coast. Birth rates were also high for non-Hispanic black adolescents in the upper Midwestern states. Similar patterns have been observed since at least 1990 (*13,14*).

The findings in this report are subject to at least two limitations. First, a full assessment of disparities in adolescent childbearing depends on having a complete understanding of patterns in adolescent pregnancy. In 2005, the most recent year for which complete and comparable data are available on all pregnancy outcomes, 57% of adolescent pregnancies ended in a live birth, 27% in an induced abortion, and 16% in a fetal loss (*9*). The downward trend in abortions among adolescents from 1991 through 2005 was much stronger than the trend in live births. A full understanding of patterns in adolescent pregnancy requires timely data on abortions and fetal losses as well as live births. Whether the trends in abortions continued downward or reversed in 2006, 2007, and 2008, as they did for live births, is unknown. An estimate by the Guttmacher Institute (using a different methodology) indicates that the adolescent abortion rate increased in 2006 (*15*). Second, estimating trends and variations in adolescent birth rates depend on having accurate estimates of population changes among age, race, and ethnic subgroups. The rates in this report are computed from population estimates based on the 2000 census (*6,11*). Rates computed on the basis of other population estimates might indicate different levels and trends. Revised rates incorporating the 2010 census results will be released when the intercensal population estimates become available.

Recently released NSFG data for 2006–2008 indicate limited change from the 2002 NSFG in sexual activity and contraceptive use among adolescents or in attitudes toward sexual activity and childbearing among adolescents (*16*). Biennial data from CDC's 1991–2009 Youth Risk Behavior Surveys (YRBS) for school-age youth also indicated limited or no change in the majority of these behaviors during recent years (*17,18*). These NSFG and YRBS findings indicate limited or no recent changes in sexual risk behaviors, compared with previously reported long-term trends of reductions in risky behaviors among adolescents from the early 1990s to the mid-2000s and might provide context for slowing declines in adolescent birth rates during recent years. Further assessment of trends and factors regarding adolescent pregnancy and childbearing, including patterns by race and Hispanic ethnicity, will be possible after data from the next NSFG covering the period 2006–2010 are released later in 2011. During the preceding 2 decades, a broad consensus has existed regarding the goal of preventing teenage pregnancy. Multiple public and private programs have been developed to meet this challenge (*2,3,19–22*). Community service coordinated with positive youth development behavioral intervention is considered to be an effective method in reducing sexual risk behaviors in adolescents (*23*). Variations in teenage birth rates reflect differences in interrelated factors, including socioeconomic factors (e.g., education and income, community characteristics, and attitudes among adolescents toward pregnancy and childbearing) that affect sexual activity and contraceptive use (*16*).

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Cigarette Smoking — United States, 1965–2008

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Cigarette smoking remains the leading cause of preventable morbidity and mortality in the United States, resulting in an estimated 443,000 premature deaths and $193 billion in direct health-care expenditures and productivity losses each year (*1*). The prevalence of cigarette smoking among youth and adult smokers has declined, but that decline has stalled during the past 5 years among adults (*2,3*). Despite overall declines in cigarette smoking, disparities in smoking and other tobacco use still persist among certain racial/ethnic minority groups, particularly among American Indians/Alaska Natives (AI/ANs) (*4*). In addition to racial/ethnic disparities in cigarette smoking, other groups have higher prevalence of cigarette smoking, with higher use reported among persons with low socioeconomic status; persons with histories of mental health and substance abuse conditions; the lesbian, gay, bisexual, and transgender community; and persons living in the South and Midwest regions of the United States (*5–7*).

Each day in the United States, approximately 3,900 persons aged 12–17 years smoke their first cigarette, and an estimated 1,000 adolescents become daily cigarette smokers (*8*). The vast majority of persons who begin smoking during adolescence are addicted to nicotine by age 20 (*9*). Among youth, factors associated with smoking include low socioeconomic status, low academic achievement (e.g., poor grades and absenteeism), high-risk sexual behavior, and use of alcohol and other drugs (*9,10*). As with adult smoking, racial/ethnic differences in cigarette smoking exist among youth smokers, with AI/ANs having the highest prevalence of cigarette smoking, particularly among females. In comparison, youth smoking among black females has consistently been lower and has declined during past years. These declines have contributed to the overall lower prevalence of cigarette smoking among black youth smokers (*2*).

Although multiple tobacco-related disparities exist, this report highlights only racial/ethnic and socioeconomic disparities because of limited data for other demographic groups. To highlight racial/ethnic and socioeconomic disparities in current cigarette smoking among youths and adults, CDC analyzed aggregated data from the National Survey on Drug Use and Health (NSDUH) for 2006–2008. NSDUH is sponsored by the Substance Abuse and Mental Health Services Administration (SAMHSA) and is designed to provide annual information about alcohol, tobacco, and illegal drug use among the noninstitutionalized U.S. household population aged ≥12 years. Specifically, NSDUH findings highlight racial/ethnic disparities in cigarette smoking among youths aged 12–17 years and adults aged ≥18 years as well as disparities in cigarette smoking among persons with low socioeconomic status in the United States. For the purposes of this report, adults who have lower levels of educational attainment, who are unemployed, or who live at, near, or below the U.S. federal poverty level are considered to have low socioeconomic status.

To measure declines in smoking among non-Hispanic white men and women and non-Hispanic black men and women aged ≥18 years, as well as the declining disparities among these populations since the 1964 Surgeon General's report on smoking and health (*11*), CDC analyzed public use data files from the National Health Interview Survey (NHIS) for 1965–2008 (Figure). Similar data are unavailable from NSDUH before 2002. Because NHIS does not collect data on tobacco use by youth, NSDUH is the primary data source for this report.

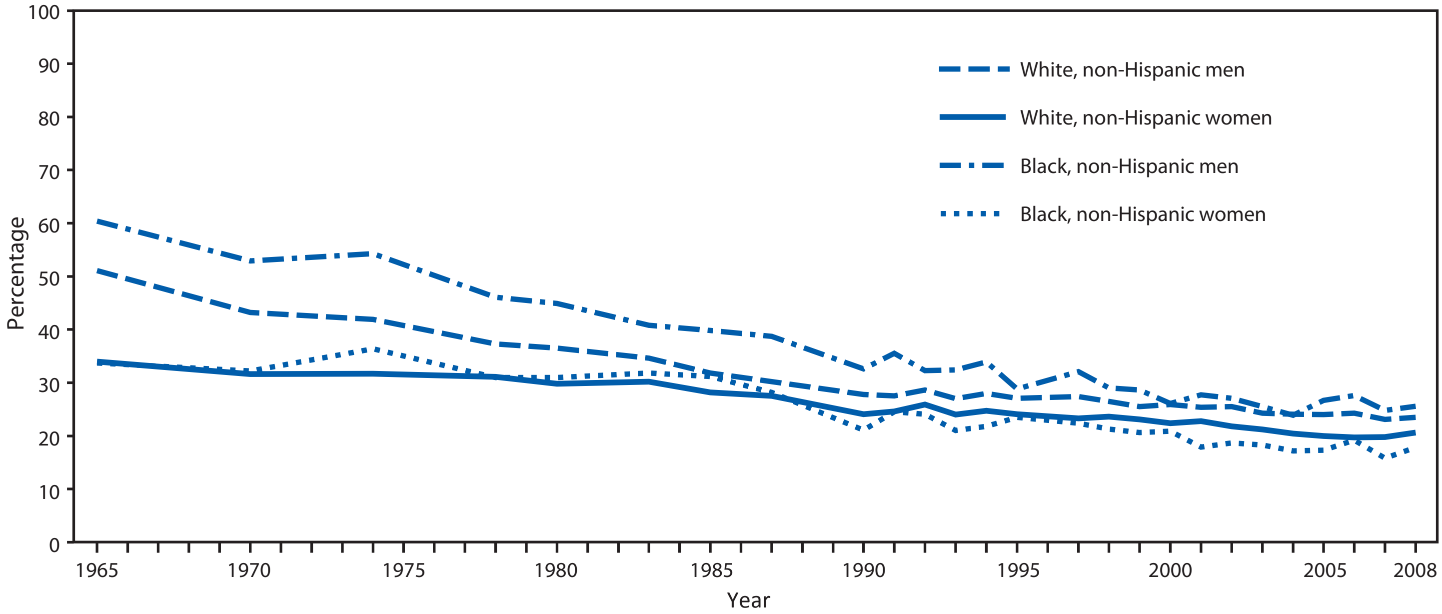
Population-weighted prevalence estimates with 95% confidence intervals were calculated using statistical software to account for the multistage probability designs of the NSDUH and NHIS. Statistical significance ($p<0.05$) was determined by use of two-sided t-tests. To explain population characteristics of unemployed smokers, logistic regression analysis was performed that adjusted for age, race/ethnicity, educational attainment, and sex.

The average response rate from the 2006–2008 NSDUH was 74.1%. The youth and adult sample sizes for the aggregated 2006–2008 data file were 53,883 and 112,570, respectively. For youths and adults, the term "current smoker" included persons who had smoked at least one cigarette during the 30 days before the survey.

NHIS is administered annually by CDC's National Center for Health Statistics and is the principal source of information on the health of the civilian, noninstitutionalized, household population of the United States. For NHIS survey years 1965–1991, current smokers included adults who reported smoking ≥100 cigarettes during their lifetimes and who were current smokers. Since 1992, current smokers were adults who reported smoking ≥100 cigarettes during their lifetimes and who specified that they currently smoked every day or on some days.

Data from the 2006–2008 NSDUH indicate that among youths aged 12–17 years, smoking was highest for AI/AN females (17.8%), AI/AN males (16.7%), non-Hispanic white females (12.4%), and non-Hispanic white males (11.3%) (Table 1). Smoking was lowest for Asian* females (2.9%), Asian males (5.2%), non-Hispanic black females (5.6%), and non-Hispanic black males (6.1%). Declining trends in smoking were observed for male and female youths of all racial/ethnic backgrounds, but AI/AN youths had the sharpest declines from 2002–2003 to 2007–2008, followed

FIGURE. Percentage of adults aged ≥18 years who were current smokers,* by sex and race/ethnicity — National Health Interview Survey (NHIS), United States, 1965–2008†



* For NHIS survey years 1965–1991, current smokers included adults who reported that they had smoked ≥100 cigarettes in their lifetime and current smoking. Since 1992, current smokers included adults who reported smoking ≥100 cigarettes during their lifetime and specified that they currently smoked every day or on some days.

† Figure depicts trend over time; data not available for certain years because questions regarding smoking were not included in NHIS for 1967–1969, 1971–1973, 1975,1981, 1982, 1984, 1986, 1989, and 1996.

TABLE 1. Current smoking* among youths aged 12–17 years, by selected characteristics — National Survey on Drug Use and Health, United States, 2006–2008

	Males (n = 2,909)		Females (n = 2,753)		Total (n = 5,662)	
Characteristic	**%**	**(95% CI)**	**%**	**(95% CI)**	**%**	**(95% CI)**
Race/Ethnicity						
White, non-Hispanic	11.3	(10.7–12.0)	12.4	(11.7–13.0)	**11.8**	**(11.4–12.3)**
Black, non-Hispanic	6.1	(5.2–7.1)	5.6	(4.7–6.5)	**5.9**	**(5.2–6.5)**
Hispanic	8.2	(7.1–9.3)	6.7	(5.6–7.7)	**7.4**	**(6.7–8.2)**
American Indian/Alaska Native	16.7	(9.8–23.5)	17.8	(11.6–24.0)	**17.2**	**(13.2–21.2)**
Asian†	5.2	(3.5–7.0)	2.9	(1.5–4.3)	**4.1**	**(3.0–5.3)**
Grade in school						
7	4.1	(3.1–5.0)	5.3	(4.2–6.5)	**4.7**	**(3.9–5.4)**
8	8.4	(7.3–9.4)	8.2	(7.2–9.3)	**8.3**	**(7.6–9.0)**
9	12.7	(11.4–13.9)	12.9	(11.6–14.1)	**12.8**	**(11.9–13.6)**
10	17.3	(15.6–18.9)	16.7	(15.2–18.1)	**17.0**	**(15.9–18.0)**
11	20.4	(18.3–22.5)	18.3	(16.0–20.6)	**19.3**	**(17.7–21.0)**
12	28.9	(21.2–36.7)	18.1	(12.8–23.5)	**22.8**	**(18.5–27.1)**
Poverty status§						
<100% (below threshold)	10.2	(8.9–11.5)	10.5	(9.4–11.6)	**10.4**	**(9.4–11.3)**
100%–199% (at or near threshold)	10.8	(9.7–11.9)	10.7	(9.6–11.8)	**10.7**	**(10.0–11.5)**
≥200% (above threshold)	9.2	(8.6–9.8)	9.5	(8.9–10.1)	**9.3**	**(8.9–9.7)**

Abbreviation: CI = confidence interval.

* Current smokers include all persons who smoked at least one cigarette during the 30 days before the survey.

† Does not include Native Hawaiians or Pacific Islanders.

§ Percentage of U.S. federal poverty level, on the basis of self-reported family income or imputed family income and U.S. Census Bureau poverty thresholds, 2005–2007, available at http://www.census.gov/hhes/www/poverty.html.

by non-Hispanic white youths. Smoking among non-Hispanic black youths, although low, neither increased nor decreased from 2002–2003 to 2007–2008.

NHIS data for 1965–2008 indicate declines in smoking among both male and female non-Hispanic white and non-Hispanic black adult smokers aged ≥18 years (Figure). Although the disparity in smoking between non-Hispanic black men and non-Hispanic white men has diminished substantially, non-Hispanic black men smoked at slightly higher rates than non-Hispanic white men during 2008 (25.6% versus 23.5%, respectively; $p<0.001$). The disparity in smoking between non-Hispanic black women and non-Hispanic white women has demonstrated a reversal for longer than a decade, with non-Hispanic black women smoking at statistically significant lower rates than non-Hispanic white women during 2008 (17.8% versus 20.6% respectively; $p<0.001$).

Data from the 2006–2008 NSDUH indicate that among adults aged ≥18 years, AI/AN men (42.4%) and AI/AN women (42.0%) had the highest smoking prevalence, followed by non-Hispanic black men (33.7%) and non-Hispanic white men (28.8%) (Table 2). Smoking was lowest for both Asian women (8.8%) and Hispanic women (16.5%). Smoking increased for AI/AN men and women, but Asian men experienced the steepest declines in smoking from 2002–2003 to 2007–2008. Persons aged 26–34 years and 35–49 years had the highest smoking rates (37.8% and 33.7%, respectively), whereas persons aged ≥65 years had the lowest rate of smoking (9.4%) (Table 2). Persons whose household incomes were below the federal poverty thresholds (36.5%) or were at or near the thresholds (32.8%) had much higher prevalence of smoking, compared with persons whose household incomes were above established poverty levels (22.5%) (Table 2). Smoking decreased with increasing levels of educational attainment, with college graduates having the lowest prevalence of smoking (13.3%). Those having less than a high school education or only a high school diploma had the highest prevalence of smoking (32.0% and 29.3%, respectively). (Table 2).

Persons who were unemployed also had a high prevalence of smoking (Table 2). From aggregated data for 2006–2008, smoking prevalence among unemployed persons (44.7%) was much higher compared with persons who were employed full-time (27.8%). Unemployed persons were most likely to be aged 35–49 or 50–64 years (adjusted odds ratio [aOR]: 11.40 and 7.43, respectively), have not completed high school (aOR: 1.92), be AI/AN (aOR: 4.48) or non-Hispanic black (aOR: 2.21).

The data presented in this report are subject to at least six limitations. First, data were based on self-reports and were not validated biochemically. However, studies have indicated that self-reported smoking status is validated by measured serum cotinine levels, which yield similar prevalence estimates (*12*). Second, the NHIS questionnaire is administered only in English and Spanish; therefore, estimates for certain racial/ethnic populations might be underestimated if neither English nor Spanish is the primary language spoken. Moreover, race/ethnicity was not adjusted for by socioeconomic status. Third, because NHIS and NSDUH do not include institutionalized populations and persons in the military, these results might not be generalizable to these groups. Fourth, because the definition of current smoking for adults differed between NHIS and NSDUH, more nondaily smokers were identified in NSDUH, leading to higher prevalence estimates reported for that survey (*13*). Fifth, although smoking prevalence was determined to be lowest among Asian and Hispanic women, variations in smoking prevalence have been observed with specific Asian and Hispanic groups (e.g., Korean and Vietnamese men and Puerto Rican men and women) (*14*). Finally, because of limited sample sizes for certain population groups in both NSDUH and NHIS (e.g., AI/ANs), single-year estimates might have resulted in imprecise estimates.

Comprehensive tobacco-control strategies that include population-based policies have been demonstrated to be effective in decreasing smoking behavior among the general population (*15*). Implementation of these policy strategies should be adapted to address tobacco-related disparities among specific populations (*16*). These strategies include increasing populations covered by comprehensive smoke-free policies, including all workplaces, restaurants, and bars; increasing the price of tobacco products, coupled with evidence-based cessation services; reducing exposure to industry-targeted advertising, promotions, and sponsorship; and increasing the availability, accessibility, and effectiveness of tailored cessation services for populations affected by tobacco-related disparities (*17–19*).

The findings in this report indicate that although progress has been achieved in reducing disparities in cigarette use among certain racial/ethnic groups, less progress has been made in reducing disparities in cigarette use among persons of low socioeconomic status. Even though low socioeconomic status is a powerful determinant of smoking behavior (*20*), no single factor determines patterns of cigarette smoking and other tobacco use among vulnerable populations; rather, these are the result of complex interactions of multiple factors (e.g., socioeconomic status, cultural characteristics, acculturation, stress, biologic elements, targeted advertising, price of tobacco products, and varying capacities of communities to mount effective tobacco-control initiatives) (*4*). Consequently, enhanced surveillance efforts are needed to increase understanding of the patterns, social determinants, and existing gaps in cigarette smoking among groups disproportionately affected by this risk behavior. This level of monitoring will be necessary to increase the effectiveness of existing public health strategies and for development of tailored interventions to reduce tobacco-related disparities.

Tobacco-control efforts focused on preventing cigarette and other tobacco use among youths, especially those at risk, are critical in eliminating future tobacco-related disparities. The data provided in this report indicate that during 2002–2008, adults aged ≥26 years with less than a high school education had very high prevalence of smoking. Because the majority of established adult smokers begin smoking during their adolescence (*9*), dropping out of high school is a risk factor for smoking. These findings indicate that efforts to reduce future disparities among adults in smoking associated with lower education and other socioeconomic factors should take a lifespan approach. Therefore, continuing population-based strategies that are effective in youth tobacco use prevention (e.g.,

TABLE 2. Current smoking* among adults aged ≥18 years, by selected characteristics — National Survey on Drug Use and Health, United States, 2006–2008

	Men (n = 19,222)		Women (n = 17,809)		Total population (n = 37,031)	
Characteristic	**%**	**(95% CI)**	**%**	**(95% CI)**	**%**	**(95% CI)**
Race/Ethnicity						
White, non-Hispanic	28.8	(28.0–29.5)	25.1	(24.5–25.6)	**26.9**	**(26.4–27.3)**
Black, non-Hispanic	33.7	(31.9–35.6)	21.3	(19.7–22.9)	**26.9**	**(25.6–28.1)**
Hispanic	28.9	(27.0–30.8)	16.5	(15.2–17.8)	**22.9**	**(21.7–24.1)**
American Indian/Alaska Native	42.4	(32.1–52.6)	42.0	(34.2–49.8)	**42.2**	**(35.5–48.8)**
Asian†	21.2	(18.2–24.1)	8.8	(7.1–10.5)	**14.7**	**(13.0–16.4)**
Age group (yrs)						
18–25	33.6	(31.4–35.7)	28.1	(26.1–30.1)	**31.0**	**(29.5–32.5)**
26–34	42.1	(41.3–42.9)	33.6	(32.7–34.5)	**37.8**	**(37.2–38.5)**
35–49	38.9	(37.5–40.3)	28.6	(27.3–29.8)	**33.7**	**(32.8–34.7)**
50–64	27.9	(27.1–28.8)	23.7	(22.9–24.4)	**25.7**	**(25.1–26.4)**
≥65	10.5	(9.2–11.8)	8.6	(7.5–9.6)	**9.4**	**(8.5–10.4)**
Educational attainment§						
<High school diploma¶	37.6	(35.6–39.7)	26.4	(24.4–28.3)	**32.0**	**(30.4–33.5)**
High school graduate	33.9	(32.4–35.3)	25.3	(24.2–26.4)	**29.3**	**(28.3–30.3)**
Some college	28.1	(26.5–29.6)	23.8	(22.6–25.1)	**25.7**	**(24.7–26.8)**
College graduate	14.4	(13.4–15.4)	12.1	(11.2–13.1)	**13.3**	**(12.5–14.0)**
Employment status						
Full-time	29.7	(28.9–30.5)	25.2	(24.4–26.0)	**27.8**	**(27.2–28.4)**
Part-time	28.3	(26.6–30.0)	22.4	(21.4–23.5)	**24.5**	**(23.5–25.4)**
Unemployed	47.8	(44.5–51.2)	41.2	(38.4–43.9)	**44.7**	**(42.3–47.2)**
Other (including not in work force)	24.6	(23.3–25.9)	18.9	(18.0–19.8)	**20.9**	**(20.2–21.7)**
Poverty status**						
<100% (below threshold)	43.0	(41.1–44.9)	32.1	(30.5–33.7)	**36.5**	**(35.1–37.8)**
100%–199% (at or near threshold)	38.8	(37.4–40.2)	28.0	(26.8–29.3)	**32.8**	**(31.8–33.8)**
≥200% (above threshold)	25.2	(24.5–25.9)	19.7	(19.0–20.3)	**22.5**	**(21.9–23.0)**

Abbreviation: CI = confidence interval.

* Current smokers include all persons who smoked at least one cigarette during the 30 days before the survey.

† Does not include Native Hawaiians or Pacific Islanders.

§ Educational attainment presented for adults aged >25 years.

¶ Reported having 12 years of education.

** Percentage of U.S. federal poverty level, on the basis of self-reported family income or imputed family income and U.S. Census Bureau poverty thresholds, available at http://www.census.gov/hhes/www/poverty.html.

price increases and tobacco counter-advertisements) should be coordinated with other community-level policies and programs. A coordinated and comprehensive approach is needed to prevent the onset of tobacco use early in the lifespan such that the adult disparities observed with tobacco use can be eliminated.

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