National Epilepsy Awareness Month — November 2012

November is National Epilepsy Awareness Month. Epilepsy, which can occur at any age, is characterized by recurrent, unprovoked seizures (*1*). Epilepsy is the fourth most common neurologic disorder in the United States, after migraine, stroke, and Alzheimer's disease (*1*) but is not as well understood as less prevalent conditions such as Parkinson's disease and multiple sclerosis. Approximately one in 26 persons will develop epilepsy at some point in their lives (*2*). Delayed recognition of seizures and subsequent inadequate treatment increase the risk for additional seizures, disability, decreased health-related quality of life, and, in rare instances, death (*3*).

The recently released Institute of Medicine report, *Epilepsy Across the Spectrum: Promoting Health and Understanding*, stresses that although effective treatments are available for many types of epilepsy, 1) timely referrals and access to those treatments are lacking, 2) epilepsy care and prevention could be enhanced by better data from surveillance and research, 3) education of persons with epilepsy and their families should be thorough and include health literacy and cultural considerations, and 4) the stigma of epilepsy must be eliminated (*2*).

Additional information regarding epilepsy is available at http://www.cdc.gov/epilepsy.

References

1. Hirtz D, Thurman DJ, Gwinn-Hardy K, Mohamed M, Chaudhuri AR, Zalutsky R. How common are the "common" neurologic disorders? Neurology 2007;68:326–37.
2. Institute of Medicine. Epilepsy across the spectrum: promoting health and understanding. Washington, DC: The National Academy Press; 2012. Available at http://www.iom.edu/epilepsy. Accessed November 8, 2012.
3. Gilliam F. Optimizing health outcomes in active epilepsy. Neurology 2002;58(8 suppl 5):S9–20.

Epilepsy in Adults and Access to Care — United States, 2010

Epilepsy is a neurologic disorder that negatively affects the quality of life for millions of persons in the United States (*1*); however, nationally representative U.S. estimates of the prevalence of epilepsy are scant (*2*). To determine epilepsy prevalence among adults, assess their access to care, and provide baseline estimates for a *Healthy People 2020* objective ("Increase the proportion of persons with epilepsy and uncontrolled seizures who receive appropriate medical care") (*3*), CDC analyzed data from the 2010 National Health Interview Survey (NHIS). The results of that analysis indicated that, in 2010, an estimated 1.0% of U.S. adults and 1.9% of those with annual family income levels ≤$34,999 had active epilepsy. In addition, only 52.8% of adults with active epilepsy reported seeing a neurologic specialist in the preceding 12 months. Public health agencies can work with Epilepsy Foundation state affiliates and other health and human service providers to eliminate identified barriers to care for persons with epilepsy (*2,4*).

National estimates of epilepsy prevalence using NHIS data have not been reported since 1994 (*5*), and no recent estimates of access to care have been reported using nationally representative samples of adults with epilepsy. To estimate epilepsy prevalence among adults aged ≥18 years, CDC analyzed data

Continuing Education examination available at http://www.cdc.gov/mmwr/cme/conted_info.html#weekly.

from the 2010 NHIS, an annual cross-sectional survey of the civilian, noninstitutionalized U.S. population.* Data were analyzed from the NHIS Sample Adult component, which included supplemental questions on epilepsy.[†] Adults who responded "yes" to ever having been told by a doctor or other health professional that they had a seizure disorder or epilepsy were considered as having a history of epilepsy ("any epilepsy"). Respondents classified as having "active epilepsy" reported a history of epilepsy and either were currently taking medication to control it, or had one or more seizures in the past year, or both (6). Those who had a history of epilepsy but were not taking medication for epilepsy and had not had a seizure in the past year were classified as having "inactive epilepsy" (6).[§] These case-ascertainment questions and case-classification definitions follow standards for epidemiologic studies of epilepsy (4) and have acceptable positive predictive value for identifying clinical cases of epilepsy (7).

Epilepsy status was compared across selected demographic and health-care access characteristics: age group, sex, race/ethnicity, education level, and annual family income (using unimputed data). Those with a history of epilepsy were asked about their visits to general doctors and neurologists or epilepsy specialists ("In the past year have you seen a neurologist or epilepsy specialist for your epilepsy or seizure disorder?"). Those without epilepsy were asked about their visits to general doctors. Statistical software was used to account for the complex survey design by using stratification, clustering, and weighting to obtain appropriate population estimates, standard errors, and 95% confidence intervals (CIs). Estimates were considered statistically significantly different if their CIs did not overlap. Prevalence estimates were directly age-adjusted to the 2000 U.S. Census population. Respondent numbers in each group are unweighted; percentage estimates are weighted.

Of 27,139 adults surveyed,[¶] 480 (weighted estimate = 1.8%; approximately 4.1 million adults) reported ever being told they had epilepsy (Table 1). Of these, 275 (1.0%; approximately 2.3 million adults) were classified as having active epilepsy, and 198 (0.8%; approximately 1.7 million adults) as having inactive epilepsy. The prevalence of any epilepsy and active epilepsy did not differ significantly by age, sex, or education level. However, those with a history of epilepsy or active epilepsy were significantly more likely to be white or black or live in families at the lowest income level. Among those living in families with annual incomes of ≤$34,999, 1.9% had active epilepsy and 3.1% had any epilepsy.

Significantly more adults with active epilepsy (86.4%) or any epilepsy (76.6%) had visited a general doctor in the past 12 months than those without epilepsy (66.1%) (Table 2). More

* Additional information is available at http://www.cdc.gov/nchs/htm.
† The NHIS Sample Adult Component conditional response rate was 77.3%, and the final response rate was 60.8%.
§ Seven cases of epilepsy lacked information on medication usage or on seizure occurrence and could not be classified as either active or inactive.

¶ A total of 18 survey respondents with responses classified as refused or unknown were omitted from analysis.

TABLE 1. Age-adjusted prevalence of active epilepsy, inactive epilepsy, and any epilepsy, by selected characteristics — National Health Interview Survey, United States, 2010*

| Characteristic | Epilepsy status[†] | | | | | | | | |
| | Active epilepsy | | | Inactive epilepsy | | | Any epilepsy | | |
	No.	%	(95% CI)	No.	%	(95% CI)	No.	%	(95% CI)
Overall	**275**	**1.0**	**(0.9–1.2)**	**198**	**0.8**	**(0.6–0.9)**	**480**	**1.8**	**(1.6–2.0)**
Age group (yrs)									
18–34	48	0.7	(0.5–1.0)	58	0.9	(0.6–1.1)	108	1.6	(1.3–2.0)
35–54	114	1.1	(0.9–1.3)	85	0.9	(0.6–1.1)	200	2.0	(1.6–2.3)
55–64	62	1.4	(1.0–1.8)	35	0.8	(0.4–1.1)	99	2.2	(1.7–2.7)
≥65	51	1.0	(0.7–1.4)	20	0.3	(0.1–0.4)	73	1.3	(1.0–1.7)
Sex									
Men	102	0.9	(0.7–1.1)	95	0.8	(0.6–1.0)	201	1.7	(1.4–2.0)
Women	173	1.1	(0.9–1.3)	103	0.7	(0.6–0.9)	279	1.9	(1.6–2.1)
Race/Ethnicity[§]									
White	181	1.2	(1.0–1.4)	135	0.9	(0.7–1.0)	320	2.1	(1.8–2.3)
Black	51	1.0	(0.7–1.3)	34	0.7	(0.4–1.0)	87	1.7	(1.3–2.2)
Other	12	0.5[¶]	(0.2–0.9)	5	0.1[¶]	(0.0–0.3)	18	0.7	(0.3–1.1)
Hispanic	31	0.5	(0.3–0.7)	24	0.5	(0.3–0.7)	55	1.0	(0.7–1.2)
Annual family income ($)									
0–34,999	187	1.9	(1.5–2.2)	113	1.2	(0.9–1.4)	304	3.1	(2.7–3.5)
35,000–74,999	58	0.9	(0.6–1.1)	53	0.7	(0.5–0.9)	113	1.6	(1.3–1.9)
75,000–99,999	12	0.5[¶]	(0.2–0.8)	15	0.6[¶]	(0.2–0.9)	27	1.1	(0.6–1.5)
≥100,000	10	0.2[¶]	(0.1–0.4)	12	0.3[¶]	(0.1–0.5)	22	0.5	(0.3–0.8)
Unknown	8	0.7[¶]	(0.2–1.3)	5	0.4[¶]	(0.0–0.8)	14	1.2	(0.4–1.9)
Education level									
Less than high school graduate or GED	153	1.3	(1.0–1.5)	92	0.9	(0.7–1.1)	249	2.2	(1.8–2.5)
Some college or more	120	0.9	(0.7–1.1)	105	0.6	(0.5–0.8)	228	1.5	(1.3–1.8)
Did not answer or unknown	2	1.1[¶]	(0.0–2.8)	1	0.7[¶]	(0.0–2.0)	3	1.8[¶]	(0.0–3.8)

Abbreviations: CI = confidence interval; GED = general equivalency diploma.
* The number of respondents is unweighted; the percentage estimates are weighted.
[†] Seven cases of epilepsy lacked information on medication usage or on the presence of seizures in the past year and could not be classified as either active or inactive epilepsy.
[§] Persons identified as Hispanic might be of any race. Persons identified as white, black, or other are all non-Hispanic. The four racial/ethnic categories are mutually exclusive.
[¶] Because the relative standard error exceeds 30%, the estimate is unreliable.

persons aged ≥65 years with any epilepsy (93.1%) saw a general doctor than those aged 18–34 years with any epilepsy (65.7%).

Among adults with active epilepsy, 52.8% had visited a neurologist or epilepsy specialist in the past 12 months, as had 33.4% of those with any epilepsy (Table 2). The percentage of adults with any epilepsy and active epilepsy who had seen a neurologist or epilepsy specialist in the 12 months did not differ by age, sex, or race-ethnicity.

Reported by

Rosemarie Kobau, MPH, Yao-Hua Luo, PhD, Matthew M. Zack, MD, Sandra Helmers, MD, David J. Thurman, MD, Div of Population Health, National Center for Chronic Disease Prevention and Health Promotion, CDC. **Corresponding contributor:** *Rosemarie Kobau, rkobau@cdc.gov, 770-488-6087.*

Editorial Note

Epilepsy, or seizure disorder, is a brain disorder characterized by a tendency to have recurrent seizures. New cases of epilepsy are most common in children and older adults because risk factors are most common in these age groups. Preventable causes of epilepsy include traumatic brain injuries, stroke, cerebral infections, lead exposure, and perinatal complications; other causes include neoplasms and disorders of cerebral metabolism (*1*). Although many persons with epilepsy live full, productive lives, some face challenges, including barriers to care, untreated comorbidities, social disadvantages, and public misunderstanding about epilepsy or the abilities of persons with epilepsy (*2*). Such challenges are manifested in lower quality of life of persons with epilepsy (*2,6*).

The findings in this report indicate that estimates of epilepsy prevalence are consistent with previous estimates from the Behavioral Risk Factor Surveillance System (*6*) and other population studies (*8,9*) but slightly higher than other estimates (*10*). Data from NHIS surveys during 1986–1990 indicate an overall prevalence of epilepsy in persons of all ages of 0.47% (*5*). However, the case definitions, sampling strategy, and population distribution differ substantially between that study and this study, limiting comparisons.

TABLE 2. Adjusted percentage of adults who visited a general doctor, neurologist, or epilepsy specialist in the past 12 months, by epilepsy status and selected characteristics — National Health Interview Survey, United States, 2010*

	Epilepsy status											
	Active epilepsy			Inactive epilepsy			Any epilepsy			No epilepsy		
Characteristic	No.	%	(95% CI)	No.	%	(95% CI)	No.	%	(95% CI)	No.	%	(95% CI)
Visited general doctor in past 12 months												
Overall	**230**	**86.4**	**(81.3–91.5)**	**129**	**63.0**	**(54.7–71.3)**	**365**	**76.6**	**(71.8–81.4)**	**17,478**	**66.1**	**(65.2–66.9)**
Age group (yrs)												
18–34	37	78.9	(64.4–93.4)	31	53.8	(38.0–69.7)	70	65.7	(54.1–77.4)	3,997	53.2	(51.6–54.7)
35–54	95	89.6	(84.0–95.3)	55	62.8	(50.8–74.7)	150	77.6	(70.8–84.3)	5,847	64.0	(62.7–65.2)
55–64	52	82.9	(69.7–96.0)	24	73.1	(56.9–89.2)	78	79.6	(69.5–89.8)	3,125	76.0	(74.5–77.5)
≥65	46	93.2	(86.5–99.9)	19	92.4	(77.3–100.0)	67	93.1	(87.0–99.3)	4,509	84.9	(83.7–86.1)
Sex												
Men	82	85.5	(78.2–92.9)	54	52.8	(40.4–65.2)	140	70.6	(63.1–78.1)	7,125	61.7	(60.5–62.9)
Women	148	87.0	(80.4–93.7)	75	73.4	(63.9–82.9)	225	81.7	(76.3–87.0)	10,353	70.1	(69.1–71.2)
Race/Ethnicity[†]												
White	157	87.4	(81.3–93.5)	88	63.4	(53.8–72.9)	248	77.2	(71.8–82.6)	10,772	69.8	(68.8–70.8)
Black	39	82.8	(72.9–92.7)	25	77.2	(62.8–91.6)	66	80.8	(73.1–88.5)	2,856	62.5	(60.6–64.5)
Other	6	63.1[§]	(28.7–97.4)	3	48.7[§]	(0.0–98.8)	10	61.1	(32.6–89.6)	1,138	60.1	(57.2–63.1)
Hispanic	28	90.5	(77.6–100.0)	13	44.3	(21.2–67.5)	41	67.4	(51.9–83.0)	2,712	53.1	(51.2–54.9)
Visited neurologist or epilepsy specialist in past 12 months												
Overall	**152**	**52.8**	**(45.7–60.0)**	**14**	**6.9[§]**	**(2.8–11.1)**	**168**	**33.4**	**(28.3–38.6)**	**—[¶]**	**—**	**—**
Age group (yrs)												
18–34	30	59.4	(41.1–77.8)	3	5.4[§]	(0.0–12.1)	34	30.5	(19.3–41.7)	—	—	—
35–54	61	49.2	(38.2–60.2)	4	4.1[§]	(0.0–8.9)	66	29.5	(21.8–37.2)	—	—	—
55–64	36	54.5	(39.1–70.0)	6	19.8[§]	(3.3–36.3)	42	42.0	(29.7–54.2)	—	—	—
≥65	25	50.3	(34.1–66.6)	1	2.5[§]	(0.0–7.4)	26	39.8	(26.0–53.6)	—	—	—
Sex												
Men	53	49.5	(37.6–61.4)	5	5.6[§]	(0.0–11.6)	59	29.2	(21.4–36.9)	—	—	—
Women	99	55.3	(46.4–64.1)	9	8.3[§]	(2.2–14.4)	109	37.0	(30.2–43.9)	—	—	—
Race/Ethnicity												
White	94	50.6	(41.9–59.3)	7	6.0[§]	(1.4–10.7)	103	31.8	(25.6–38.0)	—	—	—
Black	30	65.1	(48.4–81.8)	6	12.1[§]	(2.8–21.4)	36	43.5	(30.0–57.0)	—	—	—
Other	9	59.4[§]	(22.8–96.1)	0	—	—	9	44.4[§]	(16.5–72.3)	—	—	—
Hispanic	19	54.4	(32.9–76.0)	1	9.6[§]	(0.0–27.3)	20	32.0	(16.5–47.5)	—	—	—

Abbreviation: CI = confidence interval.
* The number of respondents is unweighted; the percentage estimates are weighted.
[†] Persons identified as Hispanic might be of any race. Persons identified as white, black, or other are all non-Hispanic. The four racial/ethnic categories are mutually exclusive.
[§] Because the relative standard error exceeds 30%, the estimate is unreliable.
[¶] Adults without epilepsy were not asked about visiting a neurologist or epilepsy specialist.

Only 52.8% of those with active epilepsy had seen a neurologist or an epilepsy specialist in the past 12 months, confirming a treatment gap related to specialty care in adults with active epilepsy that is consistent with that found in previous reports (6). Epilepsy is a spectrum of disorders that require adequate access to appropriate care to ensure effective treatment to improve seizure control and quality of life. Cultural beliefs and practices, referral to and availability of specialty care, transportation barriers, and cost, might affect access to specialty care (2,4,6). Increased generalist care among older adults with epilepsy compared with those without epilepsy highlights the likelihood of multiple underlying health problems common with epilepsy (2). Increased generalist care among older adults with any epilepsy compared with youngest adults with any epilepsy might result from greater access to health-care coverage in the former.

The findings in this report are subject to at least five limitations. First, because the estimates are based on self-reported data, they might be subject to reporting bias. However, comparability of findings with BRFSS and other population surveys suggests these types of bias might be small. Second, the reported cases of epilepsy are not classified by seizure type, severity, or etiology. Third, certain acute symptomatic seizures or nonepileptic seizures might have been misclassified as epilepsy, thus overestimating prevalence. However, the small percentage of adults with nonepileptic seizures suggests that significant skewing of results is unlikely (6,7). Fourth, epilepsy prevalence might be underestimated because of underreporting associated with repercussions in disclosing epilepsy (1,2) and because of the exclusion of institutionalized adults from NHIS. Finally, because the questions on access to care in this

<div style="border:1px solid #888; padding:8px; background:#cdd8ea;">

What is already known on this topic?

Nationally representative data on epilepsy from the National Health Interview Survey (NHIS) have not been reported since 1994, and no recent estimates on access to care have been reported in nationally representative samples of adults with epilepsy.

What is added by this report?

In the 2010 NHIS, an estimated 1.0% of adults reported having active epilepsy. These adults were more likely to live in families with annual incomes ≤$34,999. Only 52.8% of adults with active epilepsy reported having seen a neurologist or epilepsy specialist in the preceding 12 months.

What are the implications for public health practice?

Approximately one in every 100 adults in the United States has active epilepsy, and many adults with active epilepsy might not receive appropriate care. These findings provide a baseline estimate to develop a target for a *Healthy People 2020* objective on epilepsy. Public health agencies can work with Epilepsy Foundation state affiliates and other health and human services providers to eliminate known barriers to care for persons with epilepsy.

</div>

study provide only limited information on epilepsy care, NHIS can only inform about broader determinants of access to care.

These data provide a baseline estimate to develop a target for a *Healthy People 2020* objective on epilepsy and can be used to monitor progress over the decade. Future studies can further examine associations from this study. Public health agencies can work with Epilepsy Foundation state affiliates and other health and human service providers to eliminate known barriers to care for persons with epilepsy (*4*).

References

1. Avanzini G, Beghi E, de Boer H, et al. Epilepsy. In: World Health Organization. Neurological disorders: public health challenges. Geneva, Switzerland: World Health Organization; 2006:56–69. Available at http://www.who.int/mental_health/neurology/neurodiso/en/index.html. Accessed November 9, 2012.
2. Institute of Medicine. Epilepsy across the spectrum: promoting health and understanding. Washington, DC: The National Academy Press; 2012. Available at http://www.iom.edu/epilepsy. Accessed November 8, 2012.
3. US Department of Health and Human Services. Healthy people 2020. Disability and health objectives: barriers to health care. DH-6. Washington, DC: US Department of Health and Human Services; 2010. Available at http://www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicId=9. Accessed November 9, 2012.
4. Thurman DJ, Beghi E, Begley CE, et al. Standards for epidemiologic studies and surveillance of epilepsy. Epilepsia 2011;52(Suppl 7):2–26.
5. CDC. Current trends prevalence of self-reported epilepsy—United States, 1986–1990. MMWR 1994;43:810–1, 817–8.
6. Kobau R, Zahran H, Thurman DJ, et al. Epilepsy surveillance among adults—19 states, Behavioral Risk Factor Surveillance System, 2005. MMWR 2008;57(No. SS-6).
7. Brooks DR, Avetisyan R, Jarrett KM, et al. Validation of self-reported epilepsy for purposes of community surveillance. Epilepsy Behav 2012;23:57–63.
8. Holden EW, Nguyen HT, Grossman E, et al. Estimating prevalence, incidence, and disease-related mortality for patients with epilepsy in managed care organizations. Epilepsia 2005;46:311–9.
9. Ottman R, Lipton RB, Ettinger AB, et al. Comorbidities of epilepsy: results from the Epilepsy Comorbidities and Health (EPIC) survey. Epilepsia 2011;52:308–15.
10. Hirtz D, Thurman DJ, Gwinn-Hardy K, Mohammed M, Chaudhuri AR, Zalutsky R. How common are the "common" neurologic disorders? Neurology 2007;68:326–37.

Comprehensive Smoke-Free Laws — 50 Largest U.S. Cities, 2000 and 2012

Secondhand smoke (SHS) exposure causes heart disease and lung cancer in nonsmoking adults and several health conditions in children (1). Only completely eliminating smoking in indoor spaces fully protects nonsmokers from SHS (1). State and local laws can provide this protection in enclosed workplaces and public places by completely eliminating smoking in these settings (1). CDC considers a smoke-free law to be comprehensive if it prohibits smoking in all indoor areas of private workplaces, restaurants, and bars, with no exceptions (2). In response to growing evidence on the health effects of SHS, communities and states have increasingly adopted comprehensive smoke-free (CSF) laws in recent years (1,2). To assess trends in protecting the population from SHS exposure, CDC and the American Nonsmokers' Rights Foundation (ANRF) compared coverage by local or state CSF laws in the 50 largest U.S. cities as of December 31, 2000, and October 5, 2012. The analysis focused on smoking restrictions in the 50 largest cities because these cities represent an important indicator of nationwide trends in local and state policy and because they are home to an estimated 47 million persons, or nearly 15% of the U.S. population. The analysis found that the number of these cities covered by local and/or state CSF laws increased from one city (2%) in 2000 to 30 cities (60%) in 2012. A total of 20 cities (40%) were not covered by a CSF law at either the local or state level in 2012, although 14 of these cities had 100% smoke-free provisions in place at the local or state level in at least one of the three settings considered. The results of this analysis indicate that substantial progress has been achieved during 2000–2012 in implementing CSF laws in the 50 largest U.S. cities. However, gaps in coverage, especially in the southern United States and in states with laws that preempt local smoking restrictions, are contributing to disparities in SHS protections.

In the United States, the strongest smoking restrictions traditionally have originated at the local level (1). Local jurisdictions began to adopt CSF laws in the 1990s (1,3). The first local CSF law was implemented by Shasta County, California, in 1993 (3). The first state CSF law was enacted by Delaware in 2002 (2). As the past decade progressed, more states enacted CSF laws, often after a number of local jurisdictions in the state had implemented such laws (1–3).

Data on the 50 largest cities were obtained from the 2000 and 2010 U.S. censuses.* The data are based on the population within city limits. In 2010, the population of these cities ranged from 365,438 in Arlington, Texas, to 8,175,133 in New York, New York, with a median population of 600,690. During 2000–2010, New Orleans, Louisiana; Honolulu, Hawaii; and St. Louis, Missouri, dropped off this list, and Louisville-Jefferson County, Kentucky; Raleigh, North Carolina; and Arlington, Texas, were added to it.

Data on local smoking restrictions in effect for the 50 largest cities as of December 31, 2000, and October 5, 2012, were obtained from the U.S. Tobacco Control Laws Database[†] maintained by ANRF. This database categorizes various types of U.S. municipal and county laws relating to tobacco, including smoking restrictions. Laws included in the database are identified through various means, including systematic scanning of tobacco control publications, websites, and e-mail discussion lists and partnerships with the National Association of County and City Health Officials and the National Association of Local Boards of Health. Senior staff members use standardized guidelines and codebooks to abstract the laws.

Data on state smoking restrictions in effect as of December 31, 2000, and October 5, 2012, were obtained from CDC's State Tobacco Activities Tracking and Evaluation (STATE) System database.[§] This database contains tobacco-related epidemiologic and economic data and information on state tobacco-related legislation. State legislation is collected quarterly from an online legal research database of state laws and is analyzed, coded, and entered into the STATE System. The STATE System contains information on state tobacco-related laws, including smoking restrictions, in effect since the fourth quarter of 1995. In addition to information on state smoking restrictions in worksites, restaurants, and bars, the STATE System contains information on state smoking restrictions in other settings, including government worksites, commercial and home-based child-care centers, multiunit housing, vehicles, hospitals, prisons, and hotels and motels.

The ANRF database tracks state smoking restrictions as well as local smoking restrictions. The STATE System and ANRF databases generally are in agreement in categorizing state smoking restrictions. However, in the few cases where these sources differ, this analysis relies on the STATE System categorization.[¶]

TABLE. Local and state comprehensive smoke-free (CSF) laws* in effect in the 50 largest U.S. cities,† by setting — United States, 2012

City	Local§				State¶				Local or state CSF laws
	W	R	B	CSF laws	W	R	B	CSF laws	
New York, NY	x	x	x	x	x	x	x	x	x
Los Angeles, CA									
Chicago, IL	x	x	x	x	x	x	x	x	x
Houston, TX	x	x	x	x					x
Philadelphia, PA		x			x				
Phoenix, AZ					x	x	x	x	x
San Antonio, TX	x	x	x	x					x
San Diego, CA		x	x						
Dallas, TX	x	x	x	x					x
San Jose, CA	x	x	x	x					x
Jacksonville, FL					x	x			
Indianapolis, IN	x	x	x	x	x	x			x
San Francisco, CA	x	x							
Austin, TX	x	x	x	x					x
Columbus, OH	x	x	x	x	x	x	x	x	x
Fort Worth, TX	x	x							
Charlotte, NC					x	x			
Detroit, MI	x				x	x	x	x	x
El Paso, TX	x	x	x	x					x
Memphis, TN					x				
Baltimore, MD	x	x	x	x	x	x	x	x	x
Boston, MA	x	x	x	x	x	x	x	x	x
Seattle, WA					x	x	x	x	x
Washington, DC					x	x	x	x	x
Nashville-Davidson, TN					x				
Denver, CO					x	x	x	x	x
Louisville-Jefferson, KY	x	x	x	x					x
Milwaukee, WI	x	x	x	x	x	x	x	x	x
Portland, OR					x	x	x	x	x
Las Vegas, NV					x	x			
Oklahoma City, OK									
Albuquerque, NM	x				x	x	x	x	x
Tucson, AZ					x	x	x	x	x
Fresno, CA									
Sacramento, CA	x								
Long Beach, CA	x	x	x	x					x
Kansas City, MO	x	x	x	x					x
Mesa, AZ					x	x	x	x	x
Virginia Beach, VA									
Atlanta, GA									
Colorado Springs, CO					x	x	x	x	x
Omaha, NE					x	x	x	x	x
Raleigh, NC					x	x			
Miami, FL					x	x			
Cleveland, OH					x	x	x	x	x
Tulsa, OK									
Oakland, CA	x								
Minneapolis, MN		x	x		x	x	x	x	x
Wichita, KS					x	x	x	x	x
Arlington, TX		x							
Total with CSF laws				16				20	30

Abbreviations: W = workplaces; R = restaurants; B = bars.
* Making workplaces, restaurants, and bars 100% smoke-free.
† Ranked by population within city limits, based on 2010 data from the U.S. Census Bureau. Information available at http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml.
§ Data on local smoking restrictions are from the American Nonsmokers' Rights Foundation's U.S. Tobacco Control Laws Database. Additional information available at http://www.no-smoke.org/lists.html.
¶ Data on state smoking restrictions are from CDC's State Tobacco Activities Tracking and Evaluation (STATE) System. Additional information available at http://www.cdc.gov/tobacco/statesystem.

Only one of the 50 largest U.S. cities (San Jose, California) was covered by a local CSF law as of December 31, 2000. None of these cities were covered by statewide CSF laws on this date, since no such laws had been implemented at the state level.

On October 5, 2012, 16 of the 50 largest cities (32%) were covered by a local CSF law (Table). Twenty of the 50 largest cities (40%) were covered by a state CSF law, including 14 (28%) of the cities that were not covered by a local CSF law and six (12%) of the cities that were covered by such a local law. Thus, 30 (60%) of the cities were covered by a local CSF law, a state CSF law, or both.

The remaining 20 cities were not covered by either local or state CSF laws. These cities are home to approximately 16 million residents, or 5% of the U.S. population. Although 14 of these cities have 100% smoke-free local or state provisions in place in at least one of the three settings considered in this study, the remaining six (Los Angeles, California; Oklahoma City, Oklahoma; Fresno, California; Virginia Beach, Virginia; Atlanta, Georgia; and Tulsa, Oklahoma) do not. The 20 cities that lack CSF laws are located in 10 states. Ten of these 20 cities are located in the southern United States (Florida, Georgia, North Carolina, Tennessee, Texas, and Virginia). Ten of the 20 cities are located in states (Florida, North Carolina, Oklahoma, Pennsylvania, Tennessee, and Virginia) with less than comprehensive state smoking restrictions that preempt (i.e., prohibit) local smoking restrictions that differ from state law.** Six of the 20 cities that lack CSF laws are located in California, which has substantial statewide smoking restrictions that were enacted in 1994, at an early point in the evolution of smoke-free policies, and fall short of current standards for CSF laws.†† The same is true of the local laws in place in some of these California cities.

** Philadelphia's preexisting local law is exempted from state preemption, but the city is not allowed to strengthen this law, preventing it from achieving comprehensive coverage.
†† For example, these restrictions contain exemptions for separately ventilated employee break rooms and for workplaces with fewer than a specified number of employees.

Reported by

Maggie Hopkins, Cynthia Hallett, MPH, American Nonsmokers' Rights Foundation, Berkeley, California. Stephen Babb, MPH, Brian King, PhD, Michael Tynan, Allison MacNeil, MPH, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, CDC. **Corresponding contributor:** *Stephen Babb, sbabb@cdc.gov, 770-488-1172.*

Editorial Note

The results of this analysis indicate that substantial progress was achieved from 2000 to 2012 in expanding CSF policy coverage in the 50 largest U.S. cities. In the year 2000, only a relatively small number of communities had local CSF laws in place, and those communities were largely concentrated in a few states such as California and Massachusetts (*1,3*). No statewide CSF laws were in place at this time (*2*). This stands in marked contrast to the situation today. As a result of growing awareness of the health effects of SHS, diffusion of smoke-free policies as word spread about successful experiences with these policies, and changes in social norms, 26 states (including the District of Columbia) have implemented CSF laws to date (*2*).§§ Because of the same factors, many communities in other states have implemented CSF laws at the local level.¶¶ Consequently, a majority of the 50 largest U.S. cities are now covered by state or local CSF laws or both.

The first CSF laws in a state often are enacted by smaller communities (*1,3*). The successful implementation of smoke-free laws in smaller communities lays the groundwork for the adoption of similar laws by larger cities and, ultimately, at the state level (*1–3*). Regardless of whether they are implemented at the local or state level, smoke-free laws have been shown to receive high levels of public support and compliance, reduce SHS exposure, and improve health outcomes (*1,4*). The education and debate that accompany adoption of these laws generally result in increased public awareness of the law and its rationale (*1,3,5–7*). This education and debate, as well as the experience of living under the law, often lead to changes in social norms that result in increasing public support for the law (*1,4,5*).

State CSF laws can extend policy protections to a broader population than local laws, thus eliminating disparities in these protections (*1,6*). State smoke-free laws that set a floor for local smoking restrictions, rather than a ceiling, allow local SHS protections to evolve in step with emerging scientific evidence and changing standards (*5–7*).

The progress in extending comprehensive SHS protections to the majority of the 50 largest U.S. cities reported in this study is a major public health achievement. This shift reflects broader progress in extending these protections across much of the United States (*1,2*). Nearly half of the U.S. population is protected by state or local CSF laws today, compared with <3% in 2000.*** However, the findings of this analysis indicate that important gaps remain in smoke-free policy coverage in large U.S. cities. In particular, a number of cities in the southern United States have ineffective smoking restrictions or none at all. This gap in policy coverage creates disparities in public health protections that are likely to both reflect and contribute to broader tobacco-related population disparities (*1,2*).

The findings also illustrate the barrier that state preemption laws pose to local SHS protections. Ten of the 20 cities in this study that lacked CSF laws in 2012 are located in states with such laws. These laws preclude local action to increase SHS protections (*1,5–8*) and are associated with lower worker coverage by smoke-free workplace policies and reduced support among smokers for smoke-free environments (*5*). Conversely, the findings illustrate that, in states that do not preempt local smoking restrictions, cities can implement comprehensive local protections in the absence of comprehensive state protections.

The findings in this report are subject to at least five limitations. First, this study reports on local and state smoking restrictions as of October 5, 2012; the information on city population size comes from April 1, 2010 U.S. Census data, which are the most recent census data based on actual population estimates (as opposed to projections). Second, the STATE System only captures information on certain types of state smoking restrictions, primarily statutes and executive orders, and does not include information on state administrative laws, regulations, or implementation guidelines. However, most state smoking restrictions are enacted through legislation. Third, this analysis does not include laws that restrict smoking in workplaces, restaurants, or bars without making the setting in question completely smoke-free. However, the U.S. Surgeon General has concluded that only completely eliminating smoking in indoor settings fully protects nonsmokers from SHS (*1*). Fourth, neither the ANRF U.S. Tobacco Control Laws Database nor the STATE System collects information on how local or state laws are enforced or observed in practice. However, if adequate preparation and education have occurred, local and state smoke-free laws are, in most cases, largely self-enforcing. Finally, the laws considered in this report do not cover all settings where nonsmokers are exposed to SHS. In particular, private settings such as homes and vehicles can be major sources of exposure, especially for children, and

---

§§ North Dakota voters recently approved a ballot measure that establishes comprehensive smoking restrictions in that state, but this law does not take effect until December 6, 2012.
¶¶ Information available at http://www.no-smoke.org/pdf/100ordlisttabs.pdf.

*** Information available at http://www.no-smoke.org/pdf/SummaryUSPopList.pdf.

What is already known on this topic?

The number of states that implemented comprehensive state smoke-free laws prohibiting smoking in private workplaces, restaurants, and bars increased sharply, from zero states in 2000 to 26 states in 2010.

What is added by this report?

The number of the 50 largest U.S. cities covered by comprehensive local and/or state smoke-free laws in workplaces, restaurants, and bars increased from one city in 2000 to 30 cities in 2012; 20 cities were not covered by a comprehensive smoke-free law at either the local or state level in 2012.

What are the implications for public health practice?

Although substantial progress has been achieved during 2000–2012 in protecting residents of the 50 largest U.S. cities from secondhand smoke, substantial gaps in these protections remain, especially in southern states and in states with laws that preempt local smoking restrictions.

nonsmoking apartment residents who do not allow smoking in their homes can still be exposed to SHS that enters their homes from their neighbors' apartments (*1,4,9*).

Continued progress in protecting nonsmokers from SHS in workplaces and public places can be achieved through local or state action. In states with preemption, local action is not an option. New local CSF laws continue to be adopted in a number of states that lack state CSF laws but do not preempt local smoking restrictions. In early November 2012, North Dakota became the 27th state (including the District of Columbia) to enact a state CSF law, and the first state to do so since 2010.

References

1. US Department of Health and Human Services. The health consequences of involuntary exposure to tobacco smoke: a report of the Surgeon General. Atlanta, GA: US Department of Health and Human Services, CDC; 2006. Available at http://www.cdc.gov/tobacco/data_statistics/sgr/2006/index.htm. Accessed November 8, 2012.
2. CDC. State smoke-free laws for worksites, restaurants, and bars—United States, 2000–2010. MMWR 2011;60:472–5.
3. National Cancer Institute. State and local legislative action to reduce tobacco use. smoking and tobacco control monograph no. 11. Bethesda, MD: US Department of Health and Human Services, National Institutes of Health, National Cancer Institute; 2000. Available at http://cancercontrol.cancer.gov/tcrb/monographs/11/monograph_11.pdf. Accessed November 8, 2012.
4. International Agency for Research on Cancer. Evaluating the effectiveness of smoke-free policies. Lyon, France: International Agency for Research on Cancer; 2009. Available at http://www.iarc.fr/en/publications/pdfs-online/prev/handbook13/handbook13.pdf. Accessed November 8, 2012.
5. Mowery PD, Babb S, Hobart R, Tworek C, MacNeil A. The impact of state preemption of local smoking restrictions on public health protections and changes in social norms. J Environ Public Health 2012;2012:632629.
6. CDC. Preemptive state tobacco-control laws—United States, 1982–1998. MMWR 1999;47:1112–4.
7. CDC. State preemption of local smoke-free laws in government work sites, private work sites, and restaurants—United States, 2005–2009. MMWR 2010;59:105–8.
8. The Task Force on Community Preventive Services. The guide to community preventive services: what works to promote health? New York, NY: Oxford University Press; 2005. Available at http://www.thecommunityguide.org/library/book/index.html. Accessed November 8, 2012.
9. King BA, Travers MJ, Cummings KM, Mahoney MC, Hyland AJ. Secondhand smoke transfer in multiunit housing. Nicotine Tob Res 2010;12:1133–41.

Increasing Prevalence of Diagnosed Diabetes — United States and Puerto Rico, 1995–2010

In 2010, an estimated 18.8 million persons in the United States had diagnosed diabetes mellitus and another 7.0 million had undiagnosed diabetes (1). Since 1990, the prevalence of diagnosed diabetes in the United States has risen sharply (2,3) among all age groups, both sexes, and all racial/ethnic groups for which data are available (2). To learn whether the increase has been greater in some regions of the United States than in others, data on self-reported diabetes in adults collected during 1995–2010 by the Behavioral Risk Factor Surveillance System (BRFSS) were analyzed. The analysis showed that the age-adjusted prevalence of diagnosed diabetes increased during the interval in every state, the District of Columbia (DC), and Puerto Rico. In 1995, age-adjusted prevalence was ≥6% in only three states, DC, and Puerto Rico, but by 2010 it was ≥6% in every state, DC, and Puerto Rico, and ≥10.0% in six states and Puerto Rico. Strategies to prevent diabetes and its preventable risk factors are needed, especially for those at highest risk for diabetes, to slow the rise in diabetes prevalence across the United States. Continued surveillance of diabetes prevalence and incidence, its risk factors, and prevention efforts is important to measure progress of prevention efforts.

Trends from 1995–2010 were assessed using BRFSS data. Because of changes to BRFSS methods,* 2011 data were not included. BRFSS, a collaborative project of CDC and U.S. states and territories, collects information on health behaviors and conditions using state-based, ongoing, random-digit–dialed telephone surveys of noninstitutionalized U.S. civilian adults aged ≥18 years. The annual median response rate during the period studied ranged from 68.4% (1995) to 54.6% (2010). State sample sizes ranged from 1,193 in Montana to 5,107 in Maryland (1995), and from 1,964 in Alaska to 35,109 in Florida (2010). For each year of 1995–2010, the prevalence of diagnosed diabetes was calculated as the percentage of the population answering "yes" to the question, "Have you ever been told by a doctor that you have diabetes?" Women who had been told that they had diabetes only during pregnancy and respondents told they had prediabetes or borderline diabetes were not considered to have diabetes. Sampling weights and statistical software that account for the complex sampling design of BRFSS were used to estimate state prevalence and median prevalence by U.S. Census region.† Estimates were age-adjusted using the 2000 U.S. standard population and trends analyzed by state, territory, and U.S. Census region. State-specific and regional trends in age-adjusted diagnosed diabetes prevalence incorporating all 16 years of BRFSS data were assessed using least squares regression. Linear and quadratic terms for time (year of survey) were included in the models. The p-value for each overall model was <0.001.

During 1995–2010, the age-adjusted prevalence of diagnosed diabetes among U.S. adults increased in all geographic areas, with the median prevalence for all states, DC, and Puerto Rico increasing from 4.5% to 8.2% (Table). In 1995, age-adjusted prevalence was ≥6% in only three states, DC, and Puerto Rico, but, by 2010, it was ≥6% in all areas (Table, Figure 1). In 2010, median age-adjusted prevalence was highest among states in the South (9.8%) versus states in the Midwest (7.5%), Northeast (7.3%), and West (7.3%). In 2010, age-adjusted prevalence was highest (≥10.0%) in Alabama, Mississippi, Puerto Rico, South Carolina, Tennessee, Texas, and West Virginia, and lowest (6.0%–6.9%) in 12 states: Alaska, Colorado, Connecticut, Iowa, Minnesota, Montana, North Dakota, Oregon, South Dakota, Wisconsin, Vermont, and Wyoming.

During 1995–2010, the relative increase in age-adjusted prevalence of diabetes ranged from 8.5% in Puerto Rico to 226.7% in Oklahoma, with an overall median increase of 82.2%. The age-adjusted prevalence increased by ≥50% in 42 states and by ≥100% in 18 states. States in the South had the largest relative increase in prevalence, with the age-adjusted median increasing >100% (Table, Figure 2). The next largest increase was seen in the West, where the median increased 82.5%, followed by a 66.7% increase in the Midwest and a 62.2% increase in the Northeast.

Reported by

Linda S. Geiss, MA, Yanfeng Li, MD, Karen Kirtland, PhD, Lawrence Barker, PhD, Nilka R. Burrows, MPH, Edward W. Gregg, PhD, Div of Diabetes Translation, National Center for Chronic Disease Prevention and Health Promotion, CDC. **Corresponding contributor:** *Linda S. Geiss, lgeiss@cdc.gov, 770-488-1056.*

Editorial Note

This report documents the substantial increase in the prevalence of diagnosed diabetes throughout the 50 states, DC, and Puerto Rico over a 16-year period (1995–2010). Although the

---

* Information about changes to BRFSS is available at http://www.cdc.gov/surveillancepractice/reports/brfss/brfss_faqs.html.

† *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.

TABLE. Age-adjusted prevalence* of diagnosed diabetes† among adults aged ≥18 years, by U.S. Census region and state — Behavioral Risk Factor Surveillance System (BRFSS), United States,§ 1995–2010¶

Region/State	1995**		2000		2005		2010		% change (1995–2010)
	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	
U.S. overall (median)	**4.5**	**(4.2–4.7)**	**6.0**	**(5.7–6.2)**	**7.2**	**(7.0–7.6)**	**8.2**	**(7.8–8.6)**	**82.2**
Midwest (median)	**4.5**	**(3.8–4.9)**	**5.8**	**(5.3–6.2)**	**6.9**	**(6.4–7.4)**	**7.5**	**(7.0–8.6)**	**66.7**
Illinois	5.4	(4.6–6.4)	6.2	(5.3–7.1)	7.9	(7.0–8.8)	8.5	(7.6–9.4)	57.4
Indiana	5.1	(4.2–6.1)	6.0	(5.2–7.0)	8.1	(7.4–8.8)	9.3	(8.6–10.1)	82.4
Iowa	5.0	(4.3–5.9)	5.6	(4.9–6.5)	6.3	(5.7–7.0)	6.8	(6.1–7.5)	36.0
Kansas	4.7	(3.9–5.8)	5.7	(5.0–6.4)	6.7	(6.2–7.3)	7.9	(7.4–8.5)	68.1
Michigan	5.6	(4.7–6.6)	7.0	(6.1–8.1)	7.9	(7.4–8.4)	9.6	(8.8–10.3)	71.4
Minnesota	3.1	(2.6–3.7)	4.8	(4.1–5.8)	5.7	(4.9–6.6)	6.4	(5.6–7.2)	106.5
Missouri	4.2	(3.3–5.3)	6.4	(5.4–7.4)	7.5	(6.6–8.4)	8.7	(7.8–9.7)	107.1
Nebraska	4.4	(3.5–5.4)	4.8	(4.0–5.8)	7.1	(6.5–7.7)	7.2	(6.6–7.8)	63.6
North Dakota	3.6	(2.8–4.6)	5.0	(4.0–6.2)	6.2	(5.4–7.1)	6.9	(6.2–7.7)	91.7
Ohio	4.2	(3.1–5.8)	6.1	(5.1–7.4)	7.3	(6.5–8.1)	9.3	(8.6–10.1)	121.4
South Dakota	2.8	(2.1–3.8)	5.4	(4.8–6.2)	6.0	(5.5–6.6)	6.2	(5.6–6.9)	121.4
Wisconsin	4.6	(3.7–5.7)	5.9	(5.0–7.0)	6.3	(5.6–7.1)	6.6	(5.9–7.4)	43.5
Northeast (median)	**4.5**	**(4.0–5.0)**	**5.7**	**(5.0–6.1)**	**6.3**	**(6.1–7.2)**	**7.3**	**(6.8–8.3)**	**62.2**
Connecticut	4.3	(3.3–5.5)	5.2	(4.5–6.0)	6.1	(5.5–6.9)	6.7	(6.0–7.5)	55.8
Maine	3.5	(2.6–4.6)	5.8	(4.8–6.9)	6.8	(6.0–7.7)	7.6	(7.0–8.2)	117.1
Massachusetts	3.9	(3.0–5.0)	5.7	(5.1–6.3)	6.2	(5.6–6.8)	7.0	(6.5–7.5)	79.5
New Hampshire	5.1	(4.0–6.5)	4.6	(3.7–5.7)	6.3	(5.7–7.0)	7.3	(6.6–8.1)	43.1
New Jersey	4.5	(3.3–6.0)	5.6	(4.8–6.4)	7.3	(6.8–7.9)	8.5	(7.9–9.1)	88.9
New York	4.4	(3.6–5.5)	6.2	(5.3–7.2)	7.9	(7.2–8.7)	8.4	(7.8–9.0)	90.9
Pennsylvania	5.5	(4.7–6.3)	6.5	(5.7–7.5)	7.5	(6.9–8.1)	9.2	(8.6–9.9)	67.3
Rhode Island	4.6	(3.5–5.9)	5.8	(5.0–6.7)	6.2	(5.4–7.0)	7.3	(6.6–8.0)	58.7
Vermont	4.8	(4.0–5.8)	4.4	(3.8–5.2)	5.7	(5.1–6.3)	6.1	(5.5–6.7)	27.1
South (median)	**4.8**	**(4.3–5.3)**	**6.5**	**(6.4–7.0)**	**8.6**	**(8.1–9.0)**	**9.8**	**(9.0–10.1)**	**104.2**
Alabama	4.7	(3.8–5.9)	7.3	(6.2–8.6)	9.3	(8.3–10.4)	11.3	(10.4–12.3)	140.4
Arkansas	5.0	(4.0–6.1)	5.9	(5.0–6.9)	7.7	(7.0–8.5)	8.9	(8.0–9.9)	78.0
Delaware	4.4	(3.6–5.5)	6.3	(5.2–7.7)	8.3	(7.3–9.4)	7.9	(7.1–8.8)	79.5
District of Columbia	6.1	(4.6–7.9)	7.4	(6.2–8.9)	7.6	(6.6–8.6)	8.0	(7.1–9.1)	31.1
Florida	4.8	(4.1–5.6)	6.2	(5.5–6.9)	7.9	(7.1–8.9)	8.6	(8.1–9.3)	79.2
Georgia	4.0	(3.2–5.0)	7.1	(6.3–8.1)	8.9	(8.0–9.9)	9.8	(8.9–10.7)	145.0
Kentucky	3.6	(2.9–4.4)	6.3	(5.6–7.1)	8.6	(7.8–9.5)	9.3	(8.6–10.1)	158.3
Louisiana	6.7	(5.4–8.1)	6.8	(6.0–7.6)	9.1	(8.1–10.2)	9.8	(9.1–10.6)	46.3
Maryland	4.4	(3.9–5.1)	6.5	(5.7–7.5)	7.1	(6.5–7.8)	8.9	(8.2–9.7)	102.3
Mississippi	6.3	(5.2–7.7)	7.6	(6.5–8.8)	9.6	(8.8–10.5)	11.7	(10.8–12.6)	85.7
North Carolina	4.8	(4.1–5.7)	6.5	(5.6–7.4)	8.4	(8.0–8.9)	9.4	(8.8–10.0)	95.8
Oklahoma	3.0	(2.0–4.3)	5.4	(4.6–6.2)	8.6	(7.9–9.3)	9.8	(9.1–10.5)	226.7
South Carolina	5.0	(4.0–6.2)	7.2	(6.2–8.2)	10.1	(9.4–10.8)	10.0	(9.1–11.0)	100.0
Tennessee	5.3	(4.3–6.4)	7.0	(6.0–8.1)	8.8	(7.9–9.8)	10.6	(9.6–11.6)	100.0
Texas	5.7	(4.6–7.1)	6.5	(5.7–7.3)	8.3	(7.7–9.1)	10.0	(9.3–10.6)	75.4
Virginia	4.2	(3.3–5.4)	6.3	(5.0–7.9)	7.0	(6.3–7.8)	8.3	(7.5–9.2)	97.6
West Virginia	4.5	(3.7–5.4)	7.0	(6.1–8.1)	9.6	(8.6–10.6)	10.4	(9.5–11.3)	131.1

See table footnotes on page 920.

rate of increase was not uniform, the age-adjusted prevalence increased by >50% in most states and by ≥100% in 18 states.

This increase is likely the result of improved survival of persons with diabetes and increasing diabetes incidence. Nationally representative data (*4*) suggest that mortality among U.S. adults with diabetes declined substantially between 1997 and 2006, and at a faster rate than among adults without diabetes. This trend is paralleled by improvements in the health of persons with diabetes, including lower levels of risk factors for complications (e.g., hyperglycemia and uncontrolled blood pressure), decreased rates of complications associated with increased risk of death, and improvements in quality of care and medical treatments (*5–7*).

The major driver of the increase in diabetes prevalence is the increase in the incidence of diabetes in the United States since 1990 (*2,3*). Increasing incidence might be the result of many factors, including changes in diagnostic criteria, enhanced detection of undiagnosed diabetes, demographic changes in the U.S. population (e.g., aging of the population and growth of minority populations who are at greater risk for diabetes), and an increase in the prevalence of risk factors for the development of diabetes (e.g., obesity and sedentary

TABLE. (*Continued*) Age-adjusted prevalence* of diagnosed diabetes[†] among adults aged ≥18 years, by U.S. Census region and state — Behavioral Risk Factor Surveillance System (BRFSS), United States,[§] 1995–2010[¶]

Region/State	1995** %	1995** (95% CI)	2000 %	2000 (95% CI)	2005 %	2005 (95% CI)	2010 %	2010 (95% CI)	% change (1995–2010)
West (median)	**4.0**	**(3.6–4.8)**	**5.5**	**(5.0–6.1)**	**6.5**	**(6.0–6.9)**	**7.3**	**(6.7–7.8)**	**82.5**
Alaska	4.2	(2.6–6.7)	4.4	(3.2–6.0)	5.6	(4.4–7.3)	6.0	(4.7–7.7)	42.9
Arizona	4.8	(3.5–6.6)	5.9	(4.2–8.3)	7.3	(6.1–8.7)	7.5	(6.6–8.6)	56.3
California	6.2	(4.8–7.8)	7.1	(6.0–8.4)	7.4	(6.5–8.3)	8.6	(8.1–9.1)	38.7
Colorado	3.7	(2.9–4.8)	5.2	(4.2–6.5)	5.1	(4.6–5.7)	6.1	(5.6–6.6)	64.9
Hawaii	3.5	(2.6–4.5)	5.1	(4.5–5.9)	7.0	(6.2–7.8)	7.6	(6.9–8.5)	117.1
Idaho	3.6	(2.9–4.4)	4.8	(4.1–5.5)	6.8	(6.2–7.6)	7.7	(7.0–8.5)	113.9
Montana	2.9	(2.1–4.0)	4.5	(3.7–5.4)	5.2	(4.6–6.0)	6.3	(5.5–7.1)	117.2
Nevada	5.0	(3.9–6.5)	6.8	(5.1–9.0)	7.1	(6.1–8.4)	8.4	(7.2–9.7)	68.0
New Mexico	5.7	(4.4–7.3)	6.6	(5.7–7.6)	7.0	(6.3–7.8)	8.0	(7.3–8.7)	40.4
Oregon	4.0	(3.3–4.8)	5.8	(5.0–6.7)	6.5	(6.0–6.9)	6.6	(6.0–7.2)	65.0
Utah	4.2	(3.3–5.4)	5.7	(4.7–7.0)	6.4	(5.7–7.2)	7.3	(6.7–7.9)	73.8
Washington	3.1	(2.6–3.8)	5.5	(4.8–6.4)	6.3	(6.0–6.7)	7.3	(6.9–7.8)	135.5
Wyoming	3.3	(2.6–4.2)	5.0	(4.1–6.0)	6.3	(5.7–7.0)	6.8	(6.1–7.4)	106.1
Puerto Rico	**11.7**	**(10.1–13.4)**	**9.3**	**(8.3–10.4)**	**12.5**	**(11.4–13.6)**	**12.7**	**(11.6–13.9)**	**8.5**

Abbreviation: CI = confidence interval.

* Age-adjusted to the 2000 U.S. standard population; weighted estimates.
[†] Respondents were asked, "Has a doctor, nurse, or other health professional ever told you that you had diabetes?" Refused, "don't know," and missing responses were excluded from analyses. Women who were told they had diabetes only during pregnancy were considered not to have diabetes.
[§] Includes the District of Columbia and Puerto Rico.
[¶] Incorporating all 16 years of BRFSS data, state-specific and regional trends in age-adjusted diagnosed diabetes prevalence were assessed using least squares regression. Linear and quadratic terms for time were included in the models. The p-value for each overall model was <0.001. Nonsignificant quadratic terms were dropped from the models. Quadratic trends were significant for the District of Columbia (p=0.002), Maine (p=0.05), Montana (p=0.04), New York (p=0.003), North Carolina (p=0.002), Oregon (p=0.01), South Carolina (p=0.02), South Dakota (p=0.003), Washington (p=0.001), West Virginia (p=0.004), and Puerto Rico (p=0.03), and the Northeast (p=0.02) and South (p=0.02) U.S. Census regions.
** Estimates for the District of Columbia and Puerto Rico used 1996 data.

lifestyle). Although the contribution of each factor to increasing diabetes incidence cannot be discerned, the increase in diabetes prevalence coincides with the increase in obesity prevalence across the United States (*3,8,9*).[§]

The prevalence of diagnosed diabetes is highest in southern and Appalachian states (*3,9,10*), and it is increasing rapidly in these areas. This might be because of the greater prevalence of risk factors for diabetes (e.g., obesity and sedentary lifestyle), a larger proportion of African American ancestry in the population, and cultural and other factors that contribute to poor nutrition and unhealthy lifestyles (*9,10*).[¶]

The findings in this report are subject to at least three limitations. First, during the period of study, BRFSS data were limited to adults living in noninstitutional households who had landline telephones. These sample restrictions, declining response rates (54.6% in 2010), and increases over time in the number of households with only cellular telephones might have biased the analysis of diabetes trends. However, the trends presented here are consistent with national survey data, which also have shown dramatic increases in diagnosed diabetes in the

United States during this same period (*2*). Second, although the validity of self-reported diabetes is high for diagnosed diabetes, approximately one quarter of all adults with diabetes are undiagnosed (*1*) and therefore, not included in prevalence estimates. Finally, these estimates of diagnosed diabetes do not differentiate between type 1 and type 2 diabetes. However, because type 2 diabetes accounts for 90%–95% of all diabetes (*1*), the results presented should reflect type 2 diabetes trends.

Strategies that target the entire population and high-risk groups are needed to reverse the trend of increasing diabetes prevalence. An example of an approach for persons at high-risk is the CDC-led National Diabetes Prevention Program,** a public-private partnership of community organizations, private insurers, employers, health-care organizations, and government agencies. With the goal of preventing or delaying the onset of type 2 diabetes in high-risk persons, the National Diabetes Prevention Program supports the nationwide implementation of evidence-based, community, lifestyle programs that promote modest weight loss, good nutritional practices, and increased physical activity among persons at high risk. Continued surveillance of diabetes prevalence and incidence, its risk factors, and prevention efforts is important to measure progress toward reducing the incidence of diabetes across the United States.

[§] Interactive motion charts showing the concomitant growth of diabetes and obesity over time across the United States and within states are available at http://www.cdc.gov/diabetes/atlas.
[¶] Interactive atlases showing the distribution and trends of diabetes prevalence, diabetes incidence, obesity, and leisure-time physical inactivity across the United States and within states are available at http://www.cdc.gov/diabetes/atlas.

** Additional information available at http://www.cdc.gov/diabetes/prevention/index.htm.

FIGURE 1. Age-adjusted prevalence (%) of diagnosed diabetes among adults aged ≥18 years — Behavioral Risk Factor Surveillance System, United States, 2010
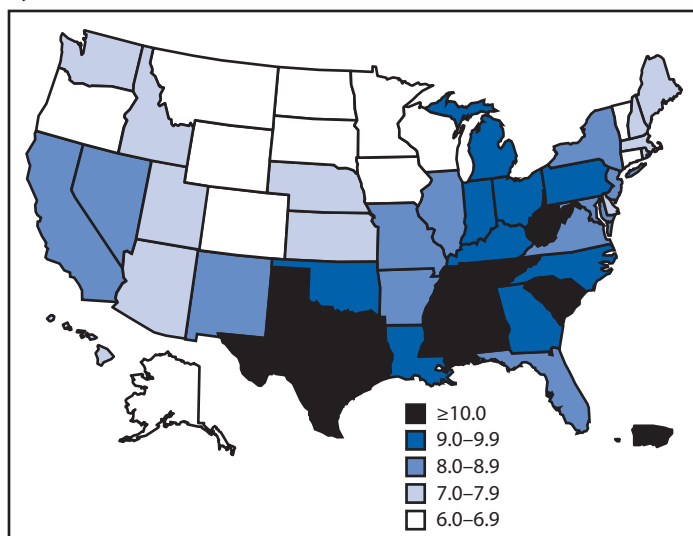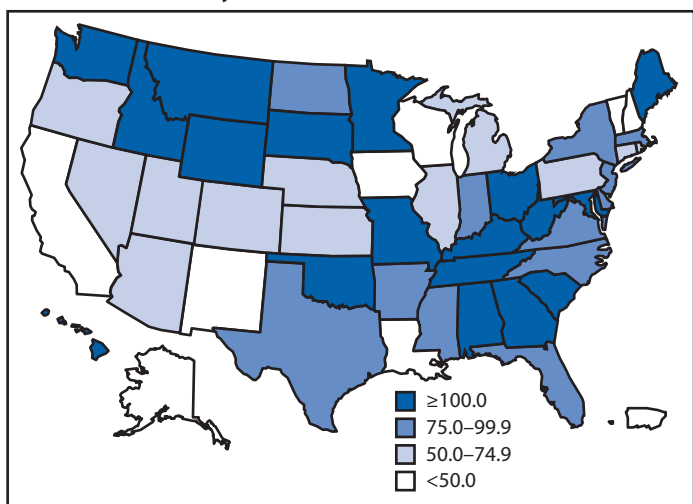

≥10.0
9.0–9.9
8.0–8.9
7.0–7.9
6.0–6.9

FIGURE 2. Percentage change in age-adjusted prevalence of diagnosed diabetes among adults aged ≥18 years — Behavioral Risk Factor Surveillance System, United States, 1995–2010

≥100.0
75.0–99.9
50.0–74.9
<50.0

References

1. CDC. National diabetes fact sheet: national estimates and general information on diabetes and prediabetes in the United States, 2011. Atlanta, GA: US Department of Health and Human Services, CDC; 2011. Available at http://www.cdc.gov/diabetes/pubs/factsheet11.htm. Accessed September 20, 2012.

What is already known on this topic?

In 2010, an estimated 18.8 million persons in the United States had diagnosed diabetes and another 7.0 million had undetected diabetes. Prevalence of diagnosed diabetes in the United States has been rising sharply since 1990 among all age groups, both sexes, and in all racial/ethnic groups for which data are available.

What is added by this report?

Based on self-reported data collected during 1995–2010 by the Behavioral Risk Factor Surveillance System, the median age-adjusted prevalence of diagnosed diabetes for all states, District of Columbia (DC), and Puerto Rico increased from 4.5% to 8.2%. In 1995, age-adjusted prevalence was ≥6% in only three states, DC, and Puerto Rico; by 2010 it was ≥6.0% in all states, DC, and Puerto Rico, and ≥10.0% in six states and Puerto Rico.

What are the implications for public health practice?

Strategies to prevent diabetes and its risk factors, both in the general population and among those at high risk for developing diabetes, are needed to reverse the persistent and ubiquitous upward trend of diabetes prevalence in the United States.

2. CDC. Diabetes data and trends. Atlanta, GA: US Department of Health and Human Services, CDC, National Diabetes Surveillance System. Available at www.cdc.gov/diabetes/statistics. Accessed November 8, 2012.
3. Geiss LS, Cowie C. Type 2 diabetes and persons at high risk of diabetes. In: Venkat Narayan KM, Williams D, Gregg EW, Cowie C, eds. Diabetes public health: from data to policy. New York, NY: Oxford University Press; 2011:15–32.
4. Gregg EW, Cheng YJ, Saydah S, et al. Trends in death rates among U.S. adults with and without diabetes between 1997 and 2006. Findings from the National Health Interview Survey. Diabetes Care 2012;35:1252–7.
5. Li Y, Burrows NR, Gregg EW, Albright A, Geiss LS. Declining rates of hospitalization for nontraumatic lower-extremity amputation in the diabetic population aged 40 years or older: U.S., 1988–2008. Diabetes Care 2012;35:273–7.
6. CDC. Incidence of end-stage renal disease attributed to diabetes among persons with diagnosed diabetes—United States and Puerto Rico, 1996–2007. MMWR 2010;59:1361–6.
7. Saaddine JB, Cadwell B, Gregg EW, et al. Improvements in diabetes processes of care and intermediate outcomes: United States, 1988–2002. Ann Intern Med 2006;144:465–74.
8. Mokdad AH, Ford ES, Bowman BA, et al. Diabetes trends in the U.S.: 1990–1998. Diabetes Care 2000;23:1278–83.
9. CDC. Estimated county-level prevalence of diabetes and obesity—United States, 2007. MMWR 2009;58:1259–63.
10. Barker LE, Kirtland KA, Gregg EW, Geiss LS, Thompson TJ. Geographic distribution of diagnosed diabetes in the U.S. A diabetes belt. Am J Prev Med 2011;40:434–9.

Vital Signs: Racial Disparities in Breast Cancer Severity — United States, 2005–2009

On November 14, 2012, this report was posted as an MMWR *Early Release on the* MMWR *website (http://www.cdc.gov/mmwr).*

Abstract

Background: Breast cancer death rates have been declining among U.S. women since 1990 because of early detection and advances in treatment; however, all racial groups have not benefited equally.

Methods: Breast cancer incidence, stage at diagnosis, and mortality rates for 2005–2009 for women in the United States and for each state were calculated using United States Cancer Statistics (USCS) data. Black to white mortality ratios and mortality to incidence ratios by race were calculated.

Results: Despite having lower incidence rates, black women had a 41% higher breast cancer death rate. More black women were diagnosed at regional or distant cancer stage compared with white women (45% versus 35%). For every 100 breast cancers diagnosed, black women had nine more deaths than white women (27 deaths per 100 breast cancers diagnosed among black women compared with 18 per 100 among white women).

Conclusions: Despite significant progress in breast cancer detection and treatment, black women experience higher death rates even though they have a lower incidence of breast cancer compared to white women.

Implications for Public Health Practice: Advances in screening and treatment have improved survival for U.S. women with breast cancer. However, black women experience inequities in breast cancer screening, follow-up, and treatment after diagnosis, leading to greater mortality. At the individual level, the maximal effectiveness of screening for breast cancer can only be achieved when all women have timely follow-up to breast cancer exams and state-of-the-art treatment. At the health system level, optimal health-care delivery may be strengthened through performance-based reimbursement, expanded use of information technology, and quality assurance reporting-protocols. Proven effective interventions such as patient navigation could be expanded for use in other settings.

Introduction

Breast cancer remains a significant public health challenge. It is the most commonly diagnosed cancer among US women. Although breast cancer deaths have declined over the last 2 decades, it remains the second leading cause of cancer deaths among women (1). It is estimated that approximately half of this decrease has resulted from advances in treatment and early detection (2). However, not all racial groups have benefited equally.

The continuum of breast cancer care begins with regular screening, and continues with timely follow-up and appropriate treatment (3). The maximum benefit of breast cancer screening will only be achieved if women of all racial groups receive not only optimal screening, but also timely follow-up and state-of-the-art treatment. Modeling studies have shown possible differences in mortality at each phase of this process (4).

This report summarizes disparities in breast cancer incidence and mortality between white and black women in the United States, using data from USCS for 2005–2009. USCS includes mortality data from the National Vital Statistics System (NVSS) and incidence data from the National Program of Cancer Registries (NPCR) and the Surveillance, Epidemiology, and End Results (SEER) program.

Methods

Data on new cases of invasive breast cancer diagnosed during 2005–2009 were obtained from population-based cancer registries affiliated with the NPCR and SEER programs, which combined cover all of the US population. Data from all states met the USCS data-quality criteria for 2005–2009.*

---

* CDC and the National Cancer Institute, in collaboration with the North American Association of Central Cancer Registries, maintain the USCS dataset, which contains the official federal statistics on cancer incidence. Cancer registries demonstrated that cancer incidence data were of high quality by meeting six USCS publication criteria: 1) case ascertainment is ≥90% complete, 2) ≤5% of cases are ascertained solely on the basis of a death certificate, 3) ≤3% of cases are missing information on sex, 4) ≤3% of cases are missing information on age, 5) ≤5% of cases are missing information on race, and 6) ≥97% of the registry's records passed a set of single-field and inter-field computerized edits that test the validity and logic of data components. Additional information available at http://www.cdc.gov/uscs and http://www.cdc.gov/cancer/npcr/uscs/technical_notes/criteria.htm.

SEER Summary Stage 2000[†] was used to characterize cancers as localized, regional, distant, or unknown stage using clinical and pathologic tumor characteristics such as tumor size, depth of invasion and extension to regional or distant tissues, involvement of regional lymph nodes, and distant metastases. Data on breast cancer deaths during 2005–2009 were based on death certificate information reported to state vital statistics offices and compiled into a national file through NVSS. Population estimates for the denominators of incidence and death rates were from the U.S. Census, as modified by SEER.[§] Annual breast cancer incidence and mortality rates per 100,000 women were age-adjusted by the direct method to the 2000 U.S. standard population (19 age groups), and corresponding 95% confidence intervals (CIs) were calculated.

To measure disparity in rates, the incidence and mortality rate ratios among black women to those among white women were calculated. The mortality to incidence ratio (MIR) was calculated by dividing the age-adjusted mortality rate by the age-adjusted incidence rate. The MIR represents the number of breast cancer deaths per 100 breast cancers diagnosed and is an indication of prognosis after diagnosis. To ensure stability of rates, statistics were not reported if the numerator had fewer than 16 observations.

Results

During 2005–2009, among women of all races, an average of 205,246 breast cancers were diagnosed each year; 173,970 were in white women, and 21,942 were in black women. Black women had a lower incidence rate (116.9 cases per 100,000) compared with white women (122.1) but a higher percentage of cancers diagnosed at regional or distant stage (45% versus 35%) (Table). In addition, black women had a 41% higher rate of breast cancer mortality (31.6 deaths per 100,000) during 2005–2009 than did white women (22.4 deaths per 100,000) (Figure 1).

Overall in the United States during 2005–2009, the MIR was 0.27 (27 deaths per 100 breast cancers) among black women and 0.18 (18 deaths per 100 breast cancers) among white women. Among the 40 states and District of Columbia with sufficient numbers of deaths for analysis, MIRs for black women showed more variability and were generally higher than those for white women. MIRs were similar among black and white women only in Delaware and Rhode Island (Figure 2).

[†] Additional information available at http://seer.cancer.gov/tools/ssm.

[§] Population estimates for the period 2005–2009 incorporate bridged single-race estimates that are derived from the original multiple race categories in the 2000 U.S. census. Adjustments to population data were made by the U.S. Census Bureau to account for the Gulf Coast population in Alabama, Mississippi, Louisiana, and Texas displaced by major population shifts resulting from hurricanes Katrina and Rita in 2005. Additional information available at http://seer.cancer.gov/popdata/index.html and http://www.census.gov/popest.

Conclusions and Comments

Black women experience higher death rates even though they have a lower incidence of breast cancer compared to white women. The disparity in breast cancer death rates among black and white women has been described previously (4). Disparities exist at each phase in the complex breast cancer care trajectory, from screening and follow-up of abnormal findings to treatment initiation and completion (5). Although the causes and magnitude of these disparities are debated, possible solutions have been implemented to help reduce differences in care along the continuum (6).

Although similar rates of mammography use among white and black women have been described using national self-reported data, studies verifying self-report have shown that mammography use might actually be lower among black women (7). One study found that after accounting for overreporting, the prevalence of mammography use decreased from 77% to 65% among white women and from 78% to 59% among black women (7). Black women are more likely to have longer intervals between screening mammograms which might lead to an increase in diagnosis of cancer at a later stage (8). Regular and adequate breast cancer screening can result in detection of breast cancer at an earlier stage and therefore a better prognosis (8,9).

Timeliness of follow-up care after an abnormal screening test is a critical step to optimal outcomes. Extensive delay after an abnormal screening mammogram leads to larger cancers, more positive lymph nodes, and subsequently poorer outcomes (10). Initiation of treatment depends on a definitive diagnosis. Timeliness and adequacy of follow-up varies by socioeconomic, community, and health system characteristics (11). Even among women with similar insurance status, black women have longer intervals to diagnosis after an abnormal mammogram than white women (12,13). For example, 20% of black women had diagnostic intervals over 60 days compared to 12% of white women. (13).

Breast cancer prognosis varies considerably by subtypes. Breast cancer can be subtyped by the expression of the estrogen receptor (ER), progesterone receptor (PR) and human epidermal growth factor receptor 2 (HER2). Women who have ER+ and PR+ breast cancers have more treatment options and a more favorable prognosis than women with tumors lacking ER and PR expression or with triple-negative (ER-, PR-, HER2-) breast cancers (14). Compared with white women, black women more frequently are found to have tumor subtypes with a poorer prognosis, especially the triple negative subtype (14). Models show that differences in breast cancer characteristics contribute to differences in breast cancer mortality between black and white women (4). Further research is needed to determine the etiology of biologic characteristics of breast cancer in black women to design effective prevention and treatment strategies.

TABLE. Average annual number and rate of cases of invasive female breast cancer,* by cancer stage, black or white race, and age group — United States, 2005–2009

| Race/Age group (yrs)	Overall			Cancer stage[†]											
				Localized[§]				Regional[§]				Distant[§]			
	No.	Rate	(95% CI)	No.	Rate	(95% CI)	%	No.	Rate	(95% CI)	%	No.	Rate	(95% CI)	%
All races	205,246	121.1	(120.8–121.3)	125,578	73.8	(73.6–74.0)	61	62,244	37.2	(37.1–37.4)	30	10,918	6.4	(6.3–6.4)	5
<40	9,941	13.1	(13.0–13.3)	4,636	6.1	(6.1–6.2)	47	4,394	5.8	(5.7–5.9)	44	622	0.8	(0.8–0.8)	6
40–49	34,452	150.8	(150.1–151.5)	19,333	84.5	(84.0–85.0)	56	12,727	55.8	(55.4–56.3)	37	1,547	6.8	(6.6–6.9)	4
50–59	48,779	241.7	(240.7–242.6)	29,052	143.8	(143.0–144.5)	60	15,895	79.0	(78.4–79.5)	33	2,628	13.0	(12.8–13.2)	5
60–69	48,777	369.5	(368.1–371.0)	31,298	237.4	(236.2–238.6)	64	13,623	102.9	(102.2–103.7)	28	2,559	19.3	(19.0–19.7)	5
70–79	37,449	413.9	(412.1–415.8)	24,989	276.2	(274.7–277.8)	67	9,334	103.2	(102.3–104.2)	25	1,961	21.7	(21.2–22.1)	5
≥80	25,849	365.4	(363.4–367.4)	16,270	230.8	(229.2–232.4)	63	6,270	88.6	(87.6–89.6)	24	1,601	22.5	(22.1–23.1)	6
White	173,970	122.1	(121.8–122.3)	108,595	75.7	(75.5–75.9)	62	51,376	36.8	(36.6–36.9)	30	8,711	6.0	(6.0–6.1)	5
<40	7,460	12.7	(12.5–12.8)	3,532	6.0	(5.9–6.1)	47	3,305	5.6	(5.5–5.7)	44	424	0.7	(0.7–0.7)	6
40–49	27,697	150.6	(149.8–151.4)	15,861	86.1	(85.5–86.7)	57	10,072	54.9	(54.4–55.4)	36	1,135	6.2	(6.0–6.3)	4
50–59	40,358	242.4	(241.4–243.5)	24,523	147.1	(146.3–147.9)	61	12,879	77.6	(77.0–78.2)	32	2,015	12.1	(11.8–12.3)	5
60–69	42,104	376.2	(374.6–377.8)	27,476	245.8	(244.5–247.1)	65	11,488	102.4	(101.5–103.2)	27	2,089	18.6	(18.3–19.0)	5
70–79	33,014	423.7	(421.7–425.8)	22,324	286.5	(284.9–288.2)	68	8,063	103.5	(102.5–104.5)	24	1,644	21.1	(20.6–21.5)	5
≥80	23,337	369.6	(367.5–371.8)	14,880	236.6	(234.9–238.3)	64	5,568	88.2	(87.1–89.2)	24	1,405	22.1	(21.6–22.7)	6
Black	21,942	116.9	(116.2–117.6)	11,373	61.0	(60.5–61.5)	52	8,034	42.3	(41.9–42.7)	37	1,801	9.6	(9.4–9.8)	8
<40	1,702	15.5	(15.2–15.9)	715	6.5	(6.3–6.8)	42	778	7.1	(6.9–7.3)	46	158	1.4	(1.3–1.5)	9
40–49	4,592	149.9	(147.9–151.8)	2,223	72.5	(71.2–73.9)	48	1,908	62.4	(61.1–63.6)	42	335	10.9	(10.4–11.4)	7
50–59	5,880	242.7	(240.0–245.5)	3,003	123.9	(121.9–125.9)	51	2,222	91.8	(90.1–93.5)	38	495	20.4	(19.6–21.3)	8
60–69	4,679	341.0	(336.6–345.4)	2,565	187.2	(184.0–190.5)	55	1,590	115.6	(113.1–118.2)	34	384	27.9	(26.7–29.2)	8
70–79	3,225	366.1	(360.5–371.8)	1,868	212.0	(207.7–216.4)	58	980	111.1	(108.1–114.3)	30	262	29.8	(28.2–31.5)	8
≥80	1,864	345.4	(338.4–352.5)	999	185.1	(180.0–190.3)	54	556	103.0	(99.2–106.9)	30	166	30.7	(28.7–32.9)	9

Abbreviation: CI = confidence interval.
Sources: CDC's National Program of Cancer Registries (NPCR) and the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) program.

* Rates are per 100,000 and age-adjusted to the 2000 U.S. standard population (19 age groups, Census P25–1130); 95% confidence intervals were calculated. To use the most accurate staging information, this report excludes cases that were identified only by autopsy or death certificate.
[†] Percentages of stages do not sum to 100% because data for cases with unknown stages are not presented.
[§] A localized cancer is confined to the primary site, a regional cancer has spread directly beyond the primary site or to regional lymph nodes, and a distant cancer has spread to other organs.

FIGURE 1. Invasive female breast cancer incidence and mortality rates,* by race[†] — United States, 2005–2009
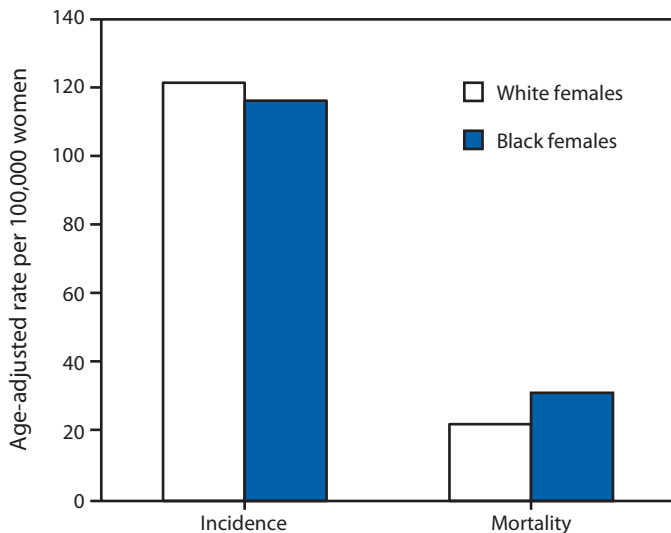
Source: CDC's National Program of Cancer Registries (NPCR), the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) program, and National Vital Statistics System mortality data (available at http://www.cdc.gov/nchs/deaths.htm).
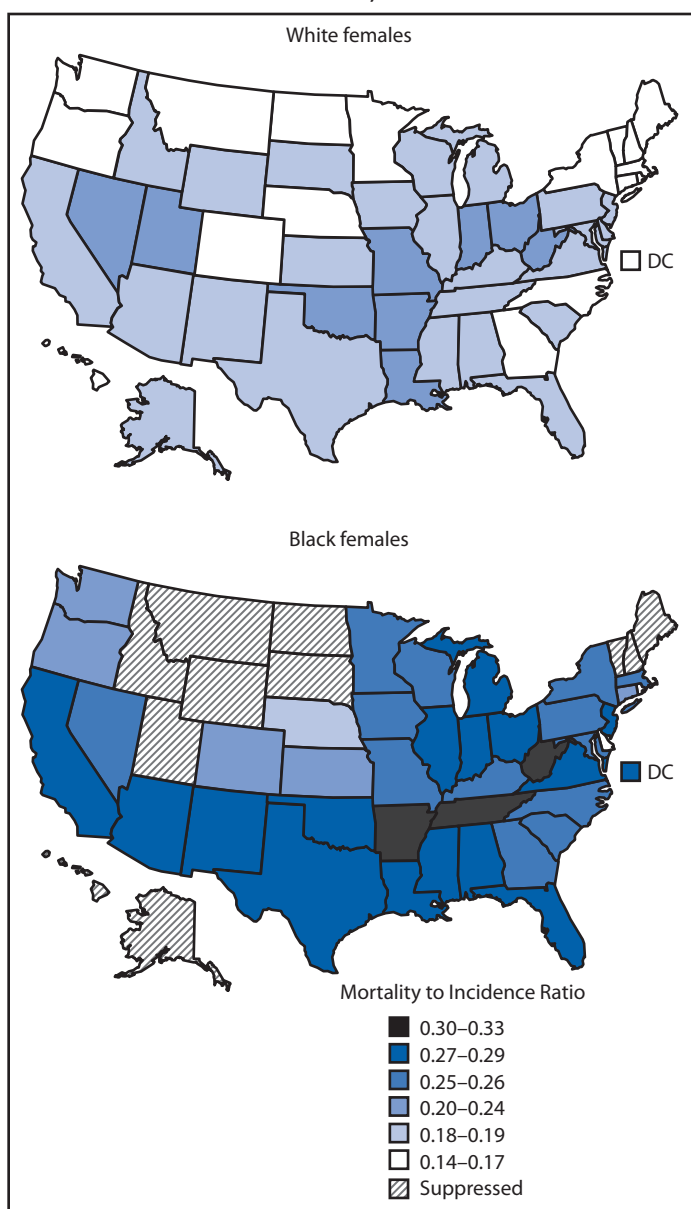* Rates are per 100,000 and age-adjusted to the 2000 U.S. standard population (19 age groups, Census P25–1130).
[†] The ratio of breast cancer incidence rates among black females compared with breast cancer incidence rates among white females was 0.96. The ratio of breast cancer mortality rates among black females compared with breast cancer mortality rates among white females was 1.41.

Advances in treatment of breast cancer are estimated to be responsible for a quarter of the recent decline in breast cancer deaths (*2*). However, several studies have reported that black women do not receive the same quality of treatment for breast cancer as white women (*15*). A recent modeling study showed that up to 19% of the mortality difference between black and white women could be eliminated if the same treatment was provided to both populations (*4*). Given equal response to chemotherapy, equal treatment of woman based on stage and tumor characteristics should lead to similar outcomes (*16*). Beginning treatment in a timely way is also important. Fewer black women (69%) start treatment within 30 days compared with white women (82%) (*15*).

The findings in this report are subject to at least three limitations. First, cause of death was not verified in this study, but lack of verification was not likely to affect the results. A recent CDC study reported that >98% of breast cancer deaths were verified using linkage with the National Death Index (*17*). Second, the analyses based on race might be biased if race and ethnicity were misclassified; although reports have shown that misclassification is minimal for categorizing by white and black race.[¶] Finally, postcensal populations for 2005–2009 were estimated by the

[¶] Additional information available at http://www.cdc.gov/cancer/npcr/uscs/technical_notes/interpreting/race.htm.

FIGURE 2. Breast cancer mortality to incidence ratios* among black and white females — United States, 2005–2009

White females

Black females

Mortality to Incidence Ratio

- 0.30–0.33
- 0.27–0.29
- 0.25–0.26
- 0.20–0.24
- 0.18–0.19
- 0.14–0.17
- Suppressed

* The mortality to incidence ratio (MIR) was calculated as the age-adjusted mortality rate divided by the age-adjusted incidence rate. The MIR is a population-based measure of fatality/prognosis after diagnosis and can be used to compare groups with disparate incidence or mortality rates. The difference in MIRs can be used as an estimate of excess deaths. An MIR of 0.14 indicates that for every 100 breast cancer cases, 14 breast cancer deaths occurred. Overall, the MIR among black females was 0.27, compared with 0.18 among white females.

U.S. Census Bureau; errors in these estimates might increase as time passes from the original recording of Census data, leading to underestimates or overestimates of incidence and mortality rates.

In the *Guide to Community Preventive Services,* evidence-based client-directed interventions include group education, one-on-one education, client reminders, reduction of structural barriers,

and reduction of out-of-pocket expenses (*18*). Peer educators and patient navigators serving in underserved communities have a proven track record of assisting women with adherence to breast cancer screening recommendations and with assuring that women with abnormal screening test results obtain appropriate follow-up tests and treatment (*19*). Observational studies have shown that patient navigation in complex health systems leads to more complete, timely breast cancer care and earlier stage at diagnosis (*19*). Emerging evidence from randomized controlled trials supports this intervention in high risk populations (*6*).

Implementation of systematic approaches for tracking screening results and assurance that follow-up and treatment are provided within predetermined intervals have been critical to the success of the National Breast and Cervical Cancer Early Detection Program (NBCCEDP) (*13*). The program holds providers accountable for reporting performance data and achieving benchmarks for screening women, including time to diagnosis after an abnormal test result and time to treatment (*13*). A recent report using data from NBCCEDP found improvement in program performance measures, with higher percentages of women completing timely follow-up after abnormal screening test results and initiating treatment (*13*). The quality of breast cancer screening, follow-up, and treatment initiation among NBCCEDP providers improved through the widespread use of performance-based protocols designed to achieve predetermined program benchmarks (*13*). Expansion of health information technology through meaningful use of electronic health records is expected to improve quality, safety, and efficiency, leading to improved health outcomes.** Finally, centralized data systems such as population-based screening registries could be used to monitor and assure the quality of screening and timely diagnosis, and treatment of breast cancer (*20).

The National Cancer Institute (NCI) sponsors the HMO Cancer Research Network, which provides a health system platform for conducting research on disparities in the delivery of screening and treatment and on interventions to improve access to and increase the effectiveness and efficiency of screening and treatment.†† NCI recently funded a multisite program with the scientific goal of supporting research to better understand how to improve the screening process from recruitment, screening, and diagnosis to referral for treatment of breast, colon, and cervical cancer.§§

At the individual level, the maximal effectiveness of screening for breast cancer can only be achieved when all women have access to timely follow-up testing after abnormal breast cancer exams and state-of-the-art treatment. More research is needed to determine the best screening and treatment strategies

---

** Additional information available at http://www.healthit.gov/policy-researchers-implementers/meaningful-use.
†† Additional information available at http://crn.cancer.gov.
§§ Additional information available at http://appliedresearch.cancer.gov/networks/prospr.

Key Points

- During 2005–2009, black women had lower breast cancer incidence rates but higher mortality rates compared with white women.
- Black women had nine more deaths than white women for every 100 breast cancers diagnosed in each group.
- Not all women receive the same follow-up of abnormal screening tests and treatment for breast cancer, leading to disparities in the frequency of breast cancer deaths.
- Patient navigation is a proven intervention in high-risk populations that could decrease inequities in access to timely follow-up and high-quality state-of-the-art treatment for breast cancer.
- For more information, see http://www.cdc.gov/vitalsigns.

for aggressive breast cancers. Optimal health-care delivery can be strengthened through performance-based reimbursement, expanded use of information technology, and quality assurance–reporting protocols. More work also is needed to develop, evaluate, and disseminate additional interventions to decrease inequities in follow-up after an abnormal mammogram and receipt of treatment (*6,10*).

Reported by

Kathleen A. Cronin, PhD, Surveillance Research Program, National Cancer Institute, Bethesda, Maryland. Lisa C. Richardson, MD, S. Jane Henley, MSPH, Jacqueline W. Miller, MD, Cheryll C. Thomas, MSPH, Arica White, PhD, Marcus Plescia, MD, Div of Cancer Prevention and Control, National Center for Chronic Disease Prevention and Health Promotion, CDC. **Corresponding contributor:** *Lisa C. Richardson, MD, lrichardson@cdc.gov, 770-488-4351.*

References

1. Eheman C, Henley SJ, Ballard-Barbash R, et al. Annual report to the nation on the status of cancer, 1975–2008, featuring cancers associated with excess weight and lack of sufficient physical activity. Cancer 2012;118:2338–66.
2. Berry DA, Cronin KA, Plevritis SK, et al; Cancer Intervention and Surveillance Modeling Network (CISNET) Collaborators. Effect of screening and adjuvant therapy on mortality from breast cancer. N Engl J Med 2005;353:1784–92.
3. Zapka JG, Taplin SH, Solberg LI, Manos MM. A framework for improving quality of cancer care: the case of breast and cervical cancer screening. Cancer Epidemiol Biomarkers Prev 2003;12:4–13.
4. Van Ravesteyn NT, Schechter CB, Near AM, et al. Race-specific impact of natural history, mammography screening, and adjuvant treatment on breast cancer mortality rates in the United States. Cancer Epidemiol Biomarkers Prev 2011;20:112–22.
5. Hewitt M, Simone JV. Ensuring quality cancer care. Washington, DC: Institute of Medicine and National Research Council; 1999.
6. Taplin SH, Yabroff KR, Zapka J. A multilevel research perspective on cancer care delivery: the example of follow-up to an abnormal mammogram. Cancer Epidemiol Biomarkers Prev 2012;21:1–7.
7. Njai R, Siegel P, Miller J, Liao Y. Misclassification of survey responses and black-white disparity in mammography use, Behavioral Risk Factor Surveillance System, 1995–2006. Prev Chronic Dis 2011;8(3):A59.
8. Smith-Bindman R, Miglioretti DL, Lurie N, et al. Does utilization of screening mammography explain racial and ethnic differences in breast cancer? Ann Intern Med 2006;144:541–53.
9. Grabler P, Dupuy D, Rai J, Bernstein S, Ansell D. Regular screening mammography before the diagnosis of breast cancer reduces black:white breast cancer differences and modifies negative biological prognostic factors. Breast Cancer Res Treat 2012;135:549–53.
10. Olivotto I, Gomi A, Bancej C, et al. Influence of delay to diagnosis on prognostic indicators of screen-detected breast carcinoma. Cancer 2002;94:2143–50.
11. Taplin S, Clauser S, Rodgers A, Breslau E, Rayson D. Interfaces across the cancer continuum offer opportunities to improve the process of care. J Natl Cancer Inst Monogr 2010:104–10.
12. Jones BA, Dailey A, Calvocoressi L, et al. Inadequate follow-up of abnormal screening mammograms: findings from the race differences in screening mammography process study (United States). Cancer Causes Control 2005;16:809–21.
13. Richardson LC, Royalty J, Howe W, Helsel W, Kammerer W, Benard VB. Timeliness of breast cancer diagnosis and initiation of treatment in the National Breast and Cervical Cancer Early Detection Program, 1996–2005. Am J Public Health 2010;100:1769–76.
14. Agurs-Collins T, Dunn BK, Browne D, Johnson KA, Lubet R. Epidemiology of health disparities in relation to the biology of estrogen receptor–negative breast cancer. Semin Oncol 2010;37:384–401.
15. Lund MJ, Brawley OP, Ward KC, Young JL, Gabram SS, Eley JW. Parity and disparity in first course treatment of invasive breast cancer. Breast Cancer Res Treat 2008;109:545–57.
16. Chavez-MacGregor M, Litton J, Chen H, et al. Pathologic complete response in breast cancer patients receiving anthracycline- and taxane-based neoadjuvant chemotherapy. Cancer 2010;116:4168–77.
17. German RR, Fink AK, Heron M, et al. The accuracy of cancer mortality statistics based on death certificates in the United States. Cancer Epidemiol 2011;35:126–31.
18. CDC. The Guide to Community Preventive Services: increasing breast, cervical, and colorectal cancer screening. Atlanta, GA: US Department of Health and Human Services, CDC; 2012. Additional information available at http://www.thecommunityguide.org/index.html.
19. Freeman HP, Rodriguez RL. History and principles of patient navigation. Cancer 2011;117(15 Suppl):3539–42.
20. Plescia M, Richardson LC, Joseph D. New roles for public health in cancer screening. CA Cancer J Clin 2012;62:217–9.

Announcements

Interactive Atlases of Diabetes, Obesity, and Physical Inactivity Available Online

Diabetes, of which 90%–95% of all cases are type 2, is becoming more common in the United States, driven in part by the increasing prevalence of risk factors for type 2 diabetes, such as obesity and physical inactivity (*1*). However, among adults at risk, lifestyle changes such as losing weight and increasing physical activity can prevent or delay type 2 diabetes (*2*).

CDC's Division of Diabetes Translation has released the Diabetes Interactive Atlases (http://www.cdc.gov/diabetes/atlas), interactive Internet tools for the public to view data and trends of diagnosed diabetes (both prevalence and incidence), obesity, and leisure-time physical inactivity at the national, state, and county levels. Users will be able to access 1) state and county-level data in the United States, 2) data on how counties compare with each other, and 3) maps and motion charts to examine how changes in diabetes coincide with changes in obesity over time and by location. The Diabetes Interactive Atlases build awareness about the burden of diabetes, obesity, and leisure-time physical inactivity in the United States and can help the public to better use existing resources for diabetes management and prevention efforts.

References

1. Geiss LS, Cowie C. Type 2 diabetes and persons at high risk of diabetes. In: Venkat Narayan KM, Williams D, Gregg EW, Cowie C, eds. Diabetes public health: from data to policy. New York, NY: Oxford University Press; 2011:15–32.
2. Knowler WC, Barrett-Connor E, Fowler SE, et al. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. N Engl J Med 2002;346:393–403.

16th Annual Conference on Vaccine Research

The 16th Annual Conference on Vaccine Research, the largest scientific forum devoted exclusively to research and development of vaccines and related technologies for prevention and treatment of disease through immunization, will be held April 22–24, 2013, at the Hyatt Regency Inner Harbor Hotel in Baltimore, Maryland. The conference brings together the diverse fields of human and veterinary vaccinology to encourage collaboration and multidisciplinary approaches among methodologic experts and experts in specific diseases.

Clinical developments in vaccine discovery, rotavirus, meningococcal vaccine, vaccines for enteric diseases, food safety vaccines, vaccine adjuvants, and adverse events are among topics scheduled for discussion during the conference. In addition, a preconference workshop, Creating Outstanding Scientific Communications: Talks, Abstracts, and Posters, will be offered by expert faculty.

Applications for travel grants to subsidize attendees from countries with limited resources must be submitted by November 27, 2012. The deadline for online submission of general abstracts is December 21, 2012. Abstracts from eligible authors may be designated for consideration for the Maurice R. Hilleman Early-Stage Career Investigator Award, which provides $10,000 for research expenses and a travel stipend and registration for the 2014 conference.

The conference is being sponsored by the National Foundation for Infectious Diseases (NFID), in collaboration with CDC and 11 other national and international agencies and organizations. Additional information is available at http://www.nfid.org, or by e-mail (vaccine@nfid.org), fax (301-907-0878), telephone (301-656-0003, ext. 19), or mail (NFID, Suite 750, 4733 Bethesda Avenue, Bethesda, MD 20814-5278).

Announcements

World Day of Remembrance for Road Traffic Victims — November 18, 2012

Road traffic crashes kill nearly 3,500 persons each day and injure or disable 50 million each year around the world (*1*). Road trauma is the leading cause of death among persons aged 10–24 years worldwide and is the leading cause of death to those in the first 3 decades of life in the United States. CDC has declared road traffic injuries a "winnable battle" and supports efforts at the United Nations (UN) and World Health Organization (WHO) to dedicate 2011–2020 as the Decade of Action for Road Safety (*2*). The Decade of Action was launched in May 2011 in more than 100 countries with the goal of preventing 5 million road traffic deaths globally by 2020.

In October 2005, the UN General Assembly adopted a resolution* calling for governments and nongovernmental organizations to mark the third Sunday in November each year as World Day of Remembrance for Road Traffic Victims. The observance was created as a means to give recognition to persons injured or killed in road traffic crashes and the plight of relatives and others who must cope with the emotional and practical consequences of these events. Ancillary materials were developed to provide nongovernmental organizations with action strategies to support victims and survivors (*3*).

---

* Improving global road safety, Resolution 60/5, United Nations General Assembly, 60th Sess. (2005). Available at http://www.un.org/en/roadsafety/ background.shtml.

CDC, WHO, and the UN Road Safety Collaboration encourage governments and nongovernmental organizations worldwide to commemorate November 18, 2012, as the World Day of Remembrance to draw the public's attention to road traffic crashes, their consequences and costs, and prevention measures. The theme of this year's World Day of Remembrance is "From Global Remembrance to Global Action across the Decade."

Practical guidance for persons or groups on how to plan and organize events on this day is available from WHO at http://whqlibdoc.who.int/publications/2006/9241594527_eng.pdf. Additional information about the World Day of Remembrance is available at http://www.worlddayofremembrance.org. Additional information about motor vehicle injuries and prevention is available at http://www.cdc.gov/winnablebattles/motorvehicleinjury.

References

1. World Health Organization. Global status report on road safety: time for action. Geneva, Switzerland: World Health Organization; 2009. Available at http://www.un.org/ar/roadsafety/pdf/roadsafetyreport.pdf. Accessed November 8, 2012.
2. CDC. Launch of Decade of Action for Global Road Safety—May 11, 2011. MMWR 2011;60:554.
3. World Health Organization. Advocating for road safety and road traffic injury victims: a guide for nongovernmental organizations. Geneva, Switzerland: World Health Organization and Global Alliance of NGOs for Road Safety; 2012. Available at http://www.who.int/violence_injury_ prevention/publications/road_traffic/ngo_guide/en/index.html. Accessed November 8, 2012.

QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Current Smoking* Among Men Aged 25–64 Years, by Age Group and Veteran Status[†] — National Health Interview Survey (NHIS), United States, 2007–2010[§]
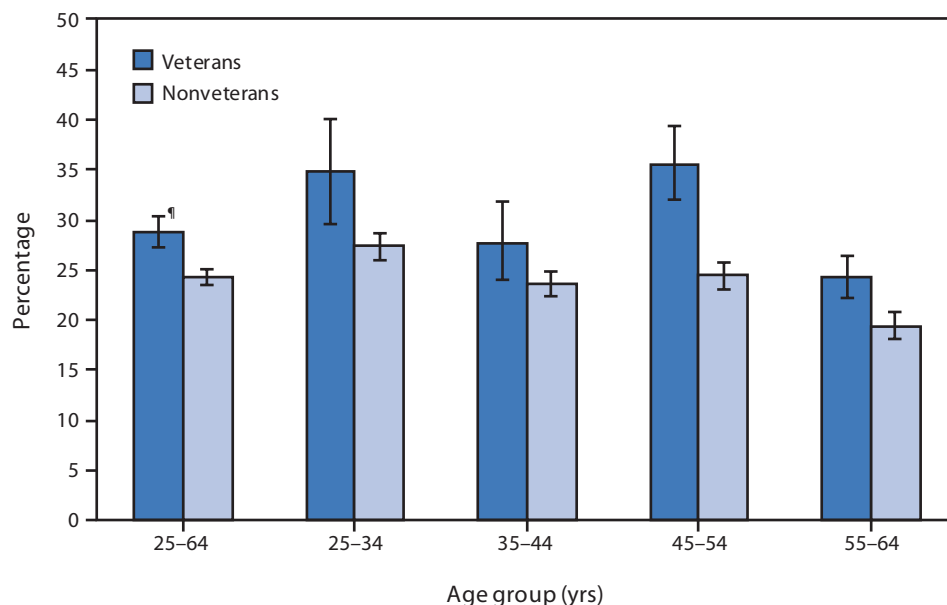
* Defined as having smoked at least 100 cigarettes in their lifetime and now smoke everyday or some days.
[†] In NHIS, veterans identify themselves by responding "yes" to the question "Have you ever been honorably discharged from active duty in the U.S. Army, Navy, Air Force, Marine Corps, or Coast Guard?" During 2007–2010, veterans accounted for 15% of the male population aged 25–64 years, ranging from 6% among men aged 25–34 years to 34% for those aged 55–64 years.
[§] Estimates are based on household interviews of a sample of the civilian, noninstitutionalized U.S. population and are derived from the NHIS sample adult component.
[¶] 95% confidence interval.

During 2007–2010, male veterans aged 25–64 years were more likely to be current smokers than nonveterans (29% versus 24%). Among men aged 45–54 years, 36% of veterans reported being current smokers, compared with 24% of nonveterans.

Source: National Health Interview Survey, 2007–2010. Available at http://www.cdc.gov/nchs/nhis.htm.

Reported by: Ellen A. Kramarow, PhD, ekramarow@cdc.gov, 301-458-4325; Patricia N. Pastor, PhD.