Centers for Disease Control and Prevention

MMWR

Morbidity and Mortality Weekly Report

Weekly / Vol. 61 / No. 20

May 25, 2012

World No Tobacco Day — May 31, 2012

Tobacco use is the leading preventable cause of death worldwide. Approximately 6 million deaths related to tobacco use occur each year, including 600,000 from second-hand smoke. If current trends continue, according to the World Health Organization (WHO), by 2030, approximately 8 million persons will die each year from tobacco use, and 80% of those persons will reside in low- and middle-income countries (*1*).

In 1987, WHO designated May 31 as World No Tobacco Day to draw global attention to the health risks of tobacco use. In 2005, provisions of the WHO Framework Convention on Tobacco Control took effect. A total of 175 countries have ratified this treaty, making it one of the most widely embraced treaties in United Nations history (*2*).

The treaty commits countries to protect the public's health by adopting various measures to reduce demand for tobacco. Those measures include increased pricing of tobacco products, protection from exposure to tobacco smoke, and regulation of product contents, packaging, and advertising (*3*). A reduction in smoking prevalence worldwide of 20%–25% could prevent 100 million premature deaths by 2020 (*4*).

References

1. World Health Organization. World No Tobacco Day 2012. Geneva, Switzerland: World Health Organization; 2012. Available at http://www.who.int/tobacco/wntd/2012/announcement/en/index.html. Accessed May 17, 2012.
2. World Health Organization. About the WHO Framework Convention on Tobacco Control. Geneva, Switzerland: World Health Organization; 2012. Available at http://www.who.int/fctc/about/en/index.html. Accessed May 7, 2012.
3. World Health Organization. WHO Framework Convention on Tobacco Control. Geneva, Switzerland: World Health Organization; 2005. Available at http://whqlibdoc.who.int/publications/2003/9241591013.pdf. Accessed May 18, 2012.
4. Frieden T, Bloomberg M. How to prevent 100 million deaths from tobacco. Lancet 2007;369:1758–61.

Adult Awareness of Tobacco Advertising, Promotion, and Sponsorship — 14 Countries

According to the 2012 *Report of the U.S. Surgeon General*, exposure to tobacco advertising, promotion, and sponsorship (TAPS) is associated with the initiation and continuation of smoking among young persons (*1*). The World Health Organization (WHO) Framework Convention on Tobacco Control (FCTC) requires countries to prohibit all forms of TAPS (*2*); the United States signed the agreement in 2004, but the action has not yet been ratified. Many countries have adopted partial bans covering direct advertising in traditional media channels; however, few countries have adopted comprehensive bans on all types of direct and indirect marketing. To assess progress toward elimination of TAPS and the level of awareness of TAPS among persons aged ≥15 years, CDC used data from the Global Adult Tobacco Survey (GATS) collected in 14 countries during 2008–2010. Awareness of any TAPS ranged from 12.4% in Turkey to 70.4% in the Philippines. In the four countries where awareness of TAPs was ≤15%, three of the countries had comprehensive bans covering all nine channels assessed by GATS, and the fourth country banned seven of the nine channels. In 12 countries, more persons were aware of advertising in stores than advertising via any other channel. Reducing exposure to TAPS is important to prevent

INSIDE

370 State Tobacco Revenues Compared with Tobacco Control Appropriations — United States, 1998–2010
375 Work-Related Asthma — 38 States and District of Columbia, 2006–2009
379 Prevalence of Stroke — United States, 2006–2010
383 Announcement

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

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

initiation of tobacco use by youths and young adults and to help smokers quit (*1*).

GATS is an ongoing, nationally representative, in-person household survey of noninstitutionalized adults aged ≥15 years.* Fourteen countries completed GATS during 2008–2010. Countries conducting GATS used a standardized core questionnaire, sample design, data collection method, and analysis protocol to enhance comparability across countries. A multistage cluster sample design was used in each country, and data were weighted in analysis to account for the complex sample design (*3*). Survey questions regarding direct tobacco marketing asked whether participants noticed cigarette advertising in five marketing channels during the previous 30 days: 1) television or radio, 2) newspapers or magazines, 3) billboards or public walls, 4) Internet, and 5) point-of-sale in stores. Questions were asked regarding four channels of indirect tobacco marketing: 1) sponsorship of sports or sporting events, 2) free samples of cigarettes, 3) sales or coupons for cigarettes, and 4) clothing or other items featuring a brand name or logo.

During 2008–2010, all 14 countries banned at least one form of tobacco marketing. Three countries (Egypt, Thailand, and Vietnam) banned all nine channels of tobacco marketing that were assessed. Eight other countries (Bangladesh, Brazil, India, Mexico, Philippines, Poland, Turkey, and Uruguay) banned five to eight channels. Three countries (China, Russia, and Ukraine) banned four or fewer channels. All 14 countries banned advertising on television or radio, and all but Russia and Mexico banned advertising in newspapers or magazines. Russia and China were the only countries that did not ban advertising on billboards or public walls; China had no bans on any types of indirect marketing (Table 1).

Participants were aware of tobacco marketing in all countries, including the three countries that banned all nine TAPS channels: Egypt (13.0%), Thailand (15.0%), and Vietnam (14.7%) (Table 2). In general, awareness of TAPS was higher in those countries with the fewest bans. An exception was the Philippines, where participants had the highest awareness of TAPS (70.4%) despite bans on five TAPS channels. The next highest levels of awareness were in Russia (65.3%), which banned one channel, and Mexico (52.8%), which banned five. In China, which banned two channels, the government owns and operates the tobacco company. TAPS awareness in this country (16.9%) was lower than in other countries with partial bans (Table 2).

In seven countries, awareness of point-of-sale advertising in stores was >20% and, with the exception of China and Turkey, awareness of point-of-sale advertising in stores was higher than awareness of any other TAPS channel (Table 2). Awareness of tobacco advertising in newspapers or magazines was highest in Mexico (17.4%) and Russia (33.3%), the only two countries that do not ban tobacco advertising in print publications. Among the indirect marketing channels, awareness was <10%

* Additional information available at http://www.who.int/tobacco/surveillance/gats/en/index.html.

The *MMWR* series of publications is published by the Office of Surveillance, Epidemiology, and Laboratory Services, Centers for Disease Control and Prevention (CDC), U.S. Department of Health and Human Services, Atlanta, GA 30333.

Suggested citation: Centers for Disease Control and Prevention. [Article title]. MMWR 2012;61:[inclusive page numbers].

Centers for Disease Control and Prevention

Thomas R. Frieden, MD, MPH, *Director*
Harold W. Jaffe, MD, MA, *Associate Director for Science*
James W. Stephens, PhD, *Director, Office of Science Quality*
Stephen B. Thacker, MD, MSc, *Deputy Director for Surveillance, Epidemiology, and Laboratory Services*
Stephanie Zaza, MD, MPH, *Director, Epidemiology and Analysis Program Office*

MMWR Editorial and Production Staff

Ronald L. Moolenaar, MD, MPH, *Editor,* MMWR *Series*
John S. Moran, MD, MPH, *Deputy Editor,* MMWR *Series*
Teresa F. Rutledge, *Managing Editor,* MMWR *Series*
Douglas W. Weatherwax, *Lead Technical Writer-Editor*
Donald G. Meadows, MA, Jude C. Rutledge, *Writer-Editors*
Martha F. Boyd, *Lead Visual Information Specialist*
Maureen A. Leahy, Julia C. Martinroe,
Stephen R. Spriggs, Terraye M. Starr
Visual Information Specialists
Quang M. Doan, MBA, Phyllis H. King
Information Technology Specialists

MMWR Editorial Board

William L. Roper, MD, MPH, Chapel Hill, NC, Chairman
Matthew L. Boulton, MD, MPH, Ann Arbor, MI
Virginia A. Caine, MD, Indianapolis, IN
Jonathan E. Fielding, MD, MPH, MBA, Los Angeles, CA
David W. Fleming, MD, Seattle, WA
William E. Halperin, MD, DrPH, MPH, Newark, NJ
King K. Holmes, MD, PhD, Seattle, WA
Deborah Holtzman, PhD, Atlanta, GA
Timothy F. Jones, MD, Nashville, TN
Dennis G. Maki, MD, Madison, WI
Patricia Quinlisk, MD, MPH, Des Moines, IA
Patrick L. Remington, MD, MPH, Madison, WI
John V. Rullan, MD, MPH, San Juan, PR
William Schaffner, MD, Nashville, TN
Dixie E. Snider, MD, MPH, Atlanta, GA
John W. Ward, MD, Atlanta, GA

in most countries, with the exception of free samples (13.0% in Russia) and clothing or items with brand names or logos (11.0% in Mexico, 18.3% in the Philippines, and 20.9% in Russia) (Table 2).

Reported by

Roberta B. Caixeta, Pan American Health Organization; Dhirendra N. Sinha, Southeast Asian Regional Office, Rula N. Khoury, European Regional Office, James Rarick, Western Pacific Office, Heba Fouad, Eastern Mediterranean Regional Office, World Health Organization. Johanna Birckmayer, Ellen Feighery, Campaign for Tobacco-Free Kids. Linda J. Andes, Terry Pechacek, Samira Asma, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, CDC. ***Corresponding contributor:*** *Linda J. Andes, landes@cdc.gov, 770-488-5784.*

What is already known on this topic?

Comprehensive bans on tobacco advertising, promotion, and sponsorship (TAPS) can reduce tobacco consumption.

What is added by this report?

Results from the Global Adult Tobacco Survey (GATS) conducted in 14 countries during 2008–2010 indicated that three countries banned all nine TAPS marketing channels, and eight banned five to eight channels. Generally, survey participant awareness of TAPS, an indicator of the success of marketing bans, was lower in those countries with the most bans. In all but two countries, awareness of in-store point-of-sale marketing was higher than for any other channel.

What are the implications for public health practice?

Comprehensive bans on TAPS might be associated with lower awareness of direct and indirect tobacco marketing, and point-of-sale advertising should be included in comprehensive bans.

Editorial Note

The WHO FCTC calls for the prohibition of all forms of tobacco advertising in digital media, broadcast media, and print. The FCTC also requires restrictions on tobacco industry sponsorship, direct and indirect incentives, and other promotions to purchase tobacco products. Countries also are encouraged to pursue more aggressive measures than those required by their obligations under the FCTC (*2*).

Awareness of tobacco marketing is one indicator of the success of advertising bans; other indicators include reduced tobacco consumption and exposure (e.g., measured directly by tobacco broadcast time or characteristics of store displays). In this report, awareness of TAPS was lower in the GATS countries with the most advertising and marketing channels banned. The importance of including bans on point-of-sale advertising and promotion is reflected in the finding that in 12 of the 14 GATS countries, adults were more aware of advertising in stores than via any other channel. As one of the few remaining channels for TAPS in most countries, point-of-sale advertising is a crucial arena for the development of tobacco control policies (*1,4*).

The findings in this report are subject to at least three limitations. First, certain countries did not assess all channels, limiting comparability. Second, data from GATS cannot be used to assess whether bans caused lower awareness of TAPS because the surveys are cross-sectional and omitted factors that might influence awareness. For example, comprehensive bans can only lower awareness of TAPS to the extent the bans are adequately enforced; compliance with TAPS bans might vary

TABLE 1. Bans on direct or indirect tobacco marketing, by marketing channel — Global Adult Tobacco Survey, 14 countries, 2008–2010

Marketing channel	Bangladesh* Jul–Aug 2009	Brazil† Oct–Dec 2008	China§ Mar 2010	Egypt* Mar–May 2009	India§ Jun 2009–Jan 2010	Mexico* Mar–Apr 2009	Philippines* Sep–Oct 2009	Poland§ Nov 2009–Mar 2010	Russia* Jun–Sep 2009	Thailand* Feb–May 2009	Turkey§ Nov 2008	Ukraine§ Nov–Mar 2010	Uruguay* Oct–Nov 2009	Vietnam§ Mar–May 2010
Direct marketing: advertising														
Television/Radio	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Newspapers/Magazines	■	■	■	■	■		■	■		■	■	■	■	■
Billboards/Public walls	■	■		■	■	■	■	■		■	■	■	■	■
Internet		■		■	■		■			■	■		■	■
Stores (point-of-sale)				■						■	■			■
Indirect marketing: promotion														
Sports sponsorship	■	■		■	■	■	■	■		■	■		■	■
Free samples	■	■		■	■	■		■		■	■	■	■	■
Sales/Coupons				■	■			■		■			■	■
Clothing/Items with brand name or logo	■	■		■	■	■				■			■	■
Any indirect marketing	6	7	2	9	8	5	5	6	1	9	7	4	8	9

* Source: World Health Organization. WHO report on the global tobacco epidemic, 2009: implementing smoke-free environments. Geneva, Switzerland: World Health Organization; 2009.
† Source: World Health Organization. WHO report on the global tobacco epidemic, 2008—the MPOWER package. Geneva, Switzerland: World Health Organization; 2008.
§ Source: World Health Organization. WHO report on the global tobacco epidemic, 2011: warning about the dangers of tobacco. Geneva, Switzerland: World Health Organization; 2011.

TABLE 2. Percentage of persons aged ≥15 years aware of direct or indirect tobacco marketing, by marketing channel — Global Adult Tobacco Survey, 14 countries, 2008–2010

Marketing channel	Bangladesh		Brazil		China		Egypt		India		Mexico		Philippines	
No. of participants	9,629		39,425		13,354		20,924		69,296		13,617		9,701	
Response rate (%)	93.6		94.0		96.0		97.2		91.8		82.5		94.7	
	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
Direct marketing: advertising														
Television/Radio	6.0	(4.9–7.3)	NA	NA	7.6	(5.9–9.9)	0.8	(0.6–1.0)	7.2	(6.6–7.7)	NA	NA	29.1	(27.2–31.0)
Newspapers/Magazines	1.9	(1.4–2.6)	NA	NA	2.4	(1.5–3.8)	0.5	(0.4–0.7)	4.7	(4.2–5.2)	17.4	(16.0–19.0)	12.5	(11.4–13.7)
Billboards/Public walls	10.6	(9.3–12.1)	NA	NA	5.2	(3.9–6.8)	1.0	(0.8–1.3)	10.3	(9.6–11.1)	21.1	(19.5–22.7)	23.6	(21.9–25.4)
Internet	0.1	(0.0–0.2)	4.7	(4.4–5.0)	1.4	(0.9–2.2)	0.6	(0.4–0.8)	0.7	(0.6–0.9)	7.1	(6.2–8.1)	3.6	(3.0–4.3)
Stores (point-of-sale)	33.2	(30.6–36.0)	30.4	(29.6–31.3)	4.1	(3.1–5.3)	8.0	(7.4–8.7)	10.7	(10.0–11.4)	36.5	(35.0–38.1)	53.7	(51.7–55.7)
Any direct marketing	37.7	(34.9–40.5)	32.2	(31.3–33.1)	14.2	(11.6–17.4)	9.5	(8.8–10.2)	20.1	(19.1–21.2)	47.0	(45.0–49.0)	66.6	(64.6–68.5)
Indirect marketing: promotion														
Sports sponsorship	1.2	(0.8–1.8)	6.1	(5.7–6.5)	3.5	(2.6–4.7)	2.1	(1.8–2.4)	NA	NA	6.2	(5.6–6.9)	2.8	(2.3–3.3)
Free samples	6.9	(5.9–8.0)	0.7	(0.6–0.8)	0.5	(0.3–0.8)	0.4	(0.3–0.6)	1.0	(0.9–1.2)	2.8	(2.4–3.2)	8.3	(7.4–9.3)
Sales/Coupons	7.0	(5.9–8.3)	0.9	(0.8–1.0)	0.8	(0.5–1.4)	0.7	(0.5–0.8)	2.5	(2.3–2.9)	5.8	(5.2–6.4)	8.2§	(7.4–9.2)§
Clothing/Items with brand name or logo	4.8	(4.0–5.7)	1.8	(1.6–2.0)	1.3	(0.8–2.2)	2.1	(1.8–2.5)	3.0	(2.7–3.4)	11.0	(10.1–12.0)	18.3	(16.7–19.9)
Any indirect marketing	14.8	(13.4–16.4)	8.3	(7.9–8.8)	5.4	(4.3–6.8)	4.5	(4.1–5.1)	5.8	(5.3–6.3)	19.6	(18.5–20.6)	26.6	(24.9–28.4)
Any marketing	42.5	(39.9–45.1)	35.7	(34.8–36.6)	16.9	(14.3–20.0)	13.0	(12.2–13.9)	23.0	(21.9–24.1)	52.8	(50.9–54.7)	70.4	(68.4–72.2)

See table footnotes below.

TABLE 2. (*Continued*) Percentage of persons aged ≥15 years aware of direct or indirect tobacco marketing, by marketing channel — Global Adult Tobacco Survey, 14 countries, 2008–2010

Marketing channel	Poland		Russia		Thailand		Turkey		Ukraine		Uruguay		Vietnam	
No. of participants	7,840		11,406		20,566		9,030		8,158		5,581		9,925	
Response rate (%)	65.1		97.7		94.2		90.9		76.1		95.2		92.7	
	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
Direct marketing: advertising														
Television/Radio	2.8*	(2.4–3.3)*	12.6	(11.2–14.3)	0.9	(0.8–1.2)	3.5	(3.0–4.0)	10.2	(9.2–11.4)	14.8	(13.1–16.7)	2.2	(1.8–2.8)
Newspapers/Magazines	2.0	(1.6–2.5)	33.3	(31.0–35.6)	0.4	(0.2–0.5)	0.6	(0.4–0.8)	11.0	(9.9–12.1)	6.9	(6.0–7.9)	0.7	(0.5–1.0)
Billboards/Public walls	NA	NA	NA	NA	0.4	(0.3–0.6)	0.3†	(0.2–0.5)	14.9†	(13.6–16.4)	16.0	(14.2–18.0)	1.5	(1.2–1.8)
Internet	4.6	(3.9–5.3)	8.7	(7.5–10.1)	0.3	(0.2–0.4)	0.8	(0.6–1.1)	4.8	(4.1–5.7)	4.6	(3.8–5.5)	0.4	(0.3–0.6)
Stores (point-of-sale)	13.9	(13.0–15.0)	43.6	(41.0–46.2)	6.7	(5.8–7.7)	2.7	(2.1–3.5)	20.5	(19.0–22.2)	20.9	(19.1–22.8)	8.6	(7.8–9.4)
Any direct marketing	17.0	(15.9–18.2)	58.2	(55.7–60.6)	7.8	(6.9–8.9)	6.3	(5.5–7.2)	34.5	(32.6–36.5)	34.8	(32.6–37.1)	10.8	(9.9–11.8)
Indirect marketing: promotion														
Sports sponsorship	NA	NA	6.6	(5.6–7.8)	1.1	(0.8–1.5)	3.3	(2.7–4.0)	2.2	(1.7–2.8)	5.2	(4.3–6.3)	0.9	(0.7–1.2)
Free samples	0.8	(0.6–1.1)	13.0	(11.5–14.8)	0.3	(0.2–0.4)	2.5	(2.1–3.1)	2.0	(1.6–2.5)	1.6	(1.2–2.3)	0.8	(0.6–1.1)
Sales/Coupons	5.0	(4.3–5.7)	NA	NA	1.5	(1.2–1.9)	NA	NA	0.3¶	(0.2–0.6)	7.8§	(6.6–9.2)	1.6	(1.3–2.0)
Clothing/Items with brand name or logo	6.3	(5.6–7.1)	20.9	(19.2–22.7)	6.6	(5.9–7.4)	2.8	(2.3–3.4)	9.6	(8.5–10.7)	5.4	(4.6–6.4)	3.2	(2.7–3.6)
Any indirect marketing	10.6	(9.7–11.6)	30.8	(28.7–32.9)	8.6	(7.8–9.5)	7.6	(6.7–8.6)	12.4	(11.2–13.8)	16.5	(14.9–18.2)	5.6	(5.0–6.2)
Any marketing	23.8	(22.5–25.1)	65.3	(63.1–67.5)	15.0	(13.9–16.3)	12.4	(11.2–13.7)	38.9	(37.0–40.8)	41.8	(39.5–44.2)	14.7	(13.7–15.8)

Abbreviations: CI = confidence interval; NA = not asked.
* Television only.
† Billboards only.
§ Sales only.
¶ Coupons only.

across countries as well as across marketing channels within countries. High levels of awareness of TAPS in the Philippines, even for channels banned by law, might indicate challenges with enforcement (*5*). Finally, although awareness of tobacco advertising has been found to be similar among adults and youths (*6*), the findings in this report were restricted to persons aged ≥15 years.

Since the 2008–2010 GATS was conducted, Brazil has implemented a ban on point-of-sale advertising in stores. Bans on direct advertising in stores and indirect marketing by providing free samples, sales or coupons, and clothing or other items will take effect in Ukraine later this year. A repeat survey of GATS countries will enable tracking of changes in awareness of TAPS within the historical context of changes in TAPS bans.

Tobacco use is the leading cause of preventable death worldwide; projections estimate that 1 billion tobacco-related deaths will occur during this century unless actions are taken to reduce tobacco use (*7*). Tobacco marketing encourages young persons to start smoking and current users to smoke more and decreases the motivation of smokers to quit (*1,8*). Comprehensive bans prohibiting TAPS reduce tobacco use among persons at all income and education levels; partial bans are less effective

(*9*). Progress toward eliminating tobacco use will require the strengthening of existing bans to cover all TAPS channels, including point-of-sale advertising. Comprehensive TAPS bans are included in WHO's list of 10 practical and affordable "best buy" interventions to save lives, prevent disease, and reduce health-care costs (*10*).

References

1. US Department of Health and Human Services. Preventing tobacco use among youth and young adults: a report of the Surgeon General. Atlanta, GA: US Department of Health and Human Services, CDC; 2012. Available at http://www.surgeongeneral.gov/library/reports/preventing-youth-tobacco-use/index.html. Accessed May 21, 2012.
2. World Health Organization. WHO Framework Convention on Tobacco Control. Geneva: Switzerland: World Health Organization; 2005.
3. CDC. Differences by sex in tobacco use and awareness of tobacco marketing—Bangladesh, Thailand, and Uruguay, 2009. MMWR 2010;59:613–8.
4. Feighery EC, Ribisl KM, Schleicher NC, Clark PI. Retailer participation in cigarette company incentive programs is related to increased levels of cigarette advertising and cheaper cigarette prices in stores. Prev Med 2004;38:876–84.
5. World Health Organization. WHO report on the global tobacco epidemic, 2011: warning about the dangers of tobacco. Geneva, Switzerland: World Health Organization; 2011. Available at http://www.who.int/tobacco/global_report/2011/en. Accessed May 21, 2012.
6. Price SM, Huhman M, Potter LD. Influencing the parents of children aged 9–13 years; findings from the VERB campaign. Am J Prev Med 2008;34:S267–74.
7. Doll R, Peto R, Boreham J, Sutherland I. Mortality in relation to smoking: 50 years' observations on male British doctors. BMJ 2004; 328:1519–28.
8. World Health Organization. WHO report on the global tobacco epidemic, 2008—the MPOWER package. Geneva, Switzerland: World Health Organization; 2008. Available at http://www.who.int/tobacco/mpower/2008/en/index.html. Accessed May 21, 2012.
9. National Cancer Institute. The role of the media in promoting and reducing tobacco use. Tobacco control monograph no. 19. Bethesda, MD: US Department of Health and Human Services, National Institutes of Health, National Cancer Institute; 2008.
10. World Health Organization. Global status report on noncommunicable diseases, 2010. Geneva, Switzerland: World Health Organization; 2011. Available at http://www.who.int/nmh/publications/ncd_report2010/en/index.html. Accessed May 21, 2012.

State Tobacco Revenues Compared with Tobacco Control Appropriations — United States, 1998–2010

In 1999, CDC published *Best Practices for Comprehensive Tobacco Control* (*1*), which outlined the elements of an evidence-based state tobacco control program and provided a recommended state funding range to substantially reduce tobacco-related disease, disability, and death. *Best Practices* recommended that states invest a combined $1.6–$4.2 billion annually in such programs and subsequently updated that recommendation to $3.7 billion annually in 2007 (*2*). To analyze states' historical investments in tobacco control and calculate the amount of funding necessary to achieve *Best Practices* recommendations, CDC tracked data from 1998 to 2010. During this period, states collected $243.8 billion in total tobacco revenues from tobacco industry settlement payments and cigarette excise taxes. State and federal appropriations for tobacco control totaled $8.1 billion, whereas CDC's *Best Practices* recommended funding of at least $29.2 billion ($1.6 billion for 9 years plus $3.7 billion for 4 years). For the entire study period, the ratio of state tobacco revenues to state and federal tobacco control appropriations was approximately 30 to 1 ($243.8 billion to $8.1 billion); in 2010, the ratio was approximately 37 to 1 ($23.96 billion to $0.64 billion). If states allocated funding for tobacco control at *Best Practices* levels, they could achieve larger and more rapid reductions in smoking and associated morbidity and mortality (*2,3*).

All 50 states and the District of Columbia (DC)* have state tobacco control programs that are funded through various revenue streams, including tobacco industry settlement payments, cigarette excise tax revenues, state general funds, the federal government, and nonprofit organizations (*2,3*). These programs reflect a coordinated effort to use evidence-based policies and practices that build state and local capacity and infrastructure to fully implement, support, and monitor population-based interventions that reduce tobacco use, prevent youth initiation, and eliminate secondhand smoke exposure (*1,3*). Evidence-based interventions include increasing the price of cigarettes, enacting comprehensive smoke-free policies, funding mass media campaigns, and making cessation services fully accessible to tobacco users (*1–3*).

In 1998, 46 states and DC reached an agreement, known as the Master Settlement Agreement (MSA), which resulted in the tobacco industry providing approximately $206 billion in revenue over a 25-year period (*2*). The four states that did not participate in the MSA (Florida, Minnesota, Mississippi, and Texas) had settled previously for approximately $40 billion to be paid over the same period (*2*). The MSA stipulated that overall state payments would be adjusted based on changes in inflation, cigarette consumption, and market share. However, although the intent of the lawsuit was to reimburse states for Medicaid costs related to tobacco use and to prevent youth initiation of smoking, the agreement did not stipulate that MSA revenues be dedicated to tobacco prevention and cessation efforts (*2,4*).

For this analysis, net state cigarette excise tax revenues were obtained from *The Tax Burden on Tobacco* (*5*), and annual settlement revenues data† were obtained from the National Association of Attorneys General§ and the Campaign for Tobacco Free Kids (*6*). Annual state tobacco control investments for the period 1998–2010 were obtained from the ImpacTeen Project,¶ and include state and federal appropriations to each state for tobacco control program efforts. To compare revenues with investments, all state and federal appropriations were adjusted to a fiscal year ending June 30 and are presented as annual dollar amounts. To compare with 2007 *Best Practices* recommendations, the 2010 appropriations also are presented as percentages of those recommendations.

From 1998 to 2010, the average state cigarette excise tax among all states increased from $0.39 to $1.44 per pack, resulting in a doubling of annual state excise tax revenues from $7.4 billion to $16.5 billion. In 2010, the excise tax ranged from $0.17 per pack in Missouri to $4.35 per pack in New York. During 1998–2010, annual settlement revenues increased from $1.4 billion in 1998, peaked at $9.3 billion in 2002, declined to $7.5 billion in 2003, and remained level at $7.4 billion in 2010 (Figure). Total annual state tobacco-related revenue (i.e., from excise taxes plus settlement payments) increased from $8.8 billion in 1998 to $24.0 billion in 2010 (Table 1).

Whereas tobacco-related revenue during the study period increased steadily, total state and federal appropriations for tobacco control increased from $262.3 million in 1998 to $820.9 million in 2002, but then decreased to $735.3 million in 2009 and to $641.1 million in 2010 (Table 2). Although 2002 marked the largest annual investment in tobacco control in U.S. history, state and federal appropriations that year

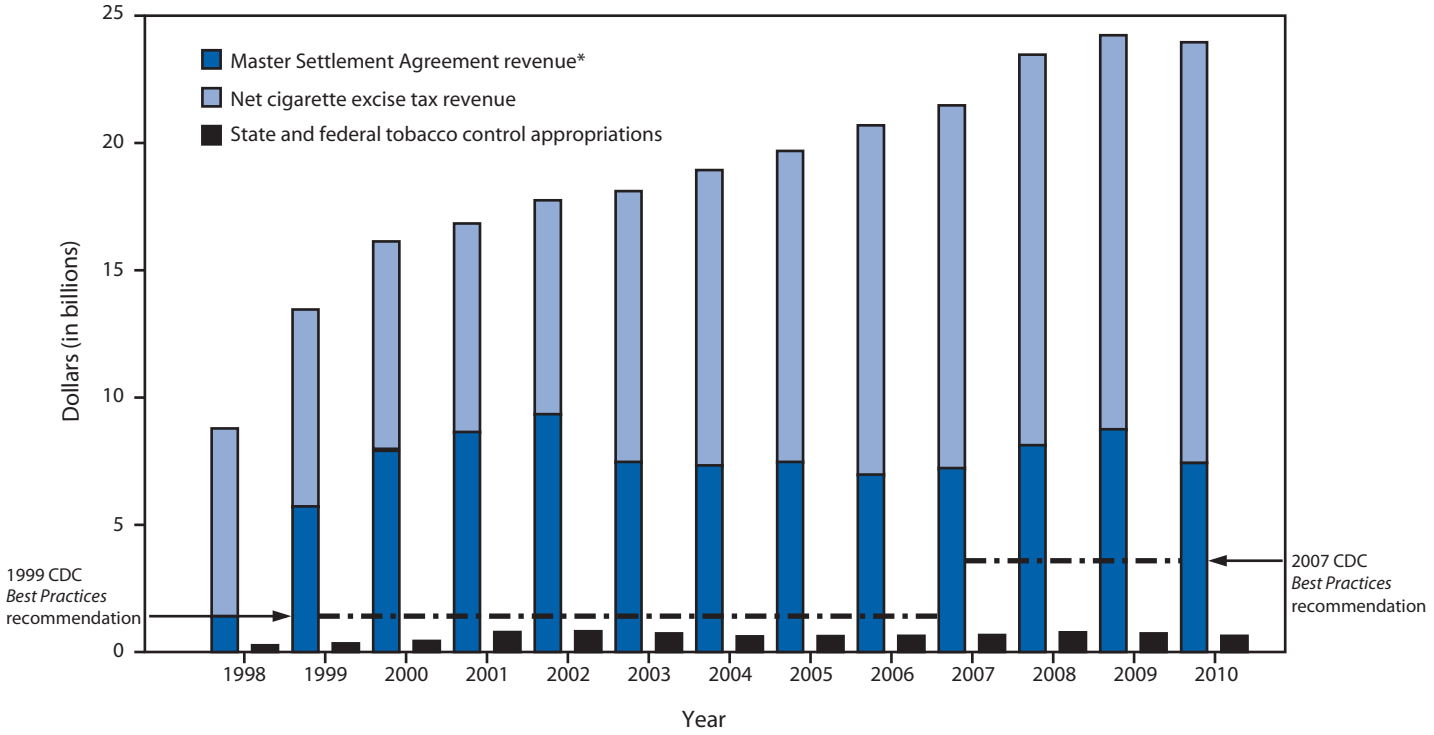
* For this report, DC is included among the states.

† Settlement revenues include MSA payments and the settlement payments made to Florida, Mississippi, Minnesota, and Texas.

§ Additional information available at http://www.naag.org/backpages/naag/tobacco/msa-payment-info.

¶ Additional information available at http://www.impacteen.org.

FIGURE. Total state tobacco-related revenues and state and federal tobacco control appropriations compared with CDC *Best Practices for Comprehensive Tobacco Control* recommendations for tobacco control funding — United States, 1998–2010



* Additional information available at http://www.naag.org/backpages/naag/tobacco/msa-payment-info.

amounted to only 51% of the 1999 minimum *Best Practices* recommendations (Figure). In 2010, the $641.1 million in appropriations was only 17.3% of the 2007 *Best Practices* recommendation (Table 2).

Reported by

Rachel Kaufmann, PhD, Epidemiology and Analysis Program Office, Office of Surveillance, Epidemiology, and Laboratory Svcs; John Francis, MPH, Div of Community Health, Michael A. Tynan, Terry Pechacek, PhD, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, CDC. ***Corresponding contributor:*** *John Francis, jfrancis@cdc.gov, 770-488-6384.*

Editorial Note

The results of this analysis show an increasing gap between state investments in tobacco control and *Best Practices* recommendations. Although all states derive revenues from cigarette excise taxes, few states have a statutory requirement requiring that a portion of these revenues be dedicated to tobacco control and prevention (*2*). Instead, most cigarette tax revenues are being used for general purposes. In addition, although state cigarette excise taxes have increased nationally, the Institute of Medicine has noted that recent tax increases largely have come in response to shortfalls in state budgets rather than as initiatives to increase spending on tobacco control (*2*).

Similarly, although the MSA ended state lawsuits to recover tobacco-related costs to Medicaid, and many state officials promised to dedicate funds to public health and tobacco control (particularly to youth smoking prevention),** states ultimately were not bound by the MSA or by Congress to allocate settlement revenues for tobacco control (*3*). Consequently, a very small percentage of settlement revenue has been dedicated by states for tobacco control programs and public health activities (*4,7*), and states increasingly have used this revenue for general purposes and to cover budget shortfalls (*2,6*). Additionally, approximately half of the states have securitized their settlement interests (i.e., sold the rights to future payments in exchange for an immediate smaller payment on some or all of their current and future settlement revenues); thus, future revenues are not available to be allocated to tobacco control programs in these states (*7*).

** Additional information available at http://www.healthystates.csg.org/nr/rdonlyres/166be14e-eb47-4d36-a78f-2c2d390275d6/0/discouragingsmokinglpb.pdf.

TABLE 1. Total state tobacco-related revenues (in millions of dollars) — United States, 1998–2010*†

State§	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total 1998–2010
Alabama	68.3	65.4	227.7	167.3	176.2	153.9	166.1	252.6	245.3	243.0	247.8	252.9	229.9	**2,496.3**
Alaska	28.4	58.7	62.7	61.6	64.1	60.0	62.4	70.1	77.4	84.2	98.6	99.8	92.4	**920.5**
Arizona	166.1	163.1	308.3	247.8	264.0	299.3	366.9	376.1	379.1	440.8	504.5	489.8	427.9	**4,433.7**
Arkansas	83.3	81.5	79.3	222.6	134.2	131.5	180.1	179.8	176.8	172.3	183.0	207.3	251.9	**2,083.7**
California	612.1	1,431.6	1,856.1	1,884.2	1,977.9	1,783.7	1,823.7	1,837.8	1,771.0	1,773.6	1,787.0	1,826.6	1,601.2	**21,966.3**
Colorado	59.6	122.8	137.3	141.4	151.1	133.5	139.7	202.4	286.1	285.3	299.5	302.0	269.5	**2,530.2**
Connecticut	120.6	204.5	215.2	227.6	282.6	357.9	392.9	372.4	375.8	366.9	470.8	462.3	509.2	**4,358.8**
Delaware	22.7	42.5	47.1	50.3	55.2	58.1	96.2	106.4	107.8	110.5	147.4	156.2	157.0	**1,157.5**
District of Columbia	17.5	45.5	52.0	53.2	58.3	55.5	59.6	59.0	58.2	58.6	66.0	80.5	70.9	**734.7**
Florida	1,000.0	959.5	1,059.3	1,163.1	1,192.0	966.9	785.8	815.8	816.4	819.2	803.1	808.6	1,598.9	**12,788.7**
Georgia	85.1	199.1	224.2	230.8	246.5	222.3	370.5	382.9	365.5	366.8	370.6	380.1	340.4	**3,784.8**
Hawaii	32.4	66.7	72.5	88.3	105.6	106.0	115.4	121.5	120.8	125.3	157.6	164.8	170.8	**1,447.8**
Idaho	25.0	41.0	45.3	45.4	48.6	45.3	68.6	68.3	67.4	69.4	74.7	74.9	65.5	**739.3**
Illinois	457.2	700.7	745.6	752.9	786.7	912.6	1,021.0	934.8	905.3	884.9	904.5	902.8	833.6	**10,742.6**
Indiana	118.1	210.6	230.4	233.9	251.6	456.5	458.0	458.0	458.3	477.9	653.1	655.7	583.4	**5,245.6**
Iowa	94.6	132.5	141.0	142.2	148.2	138.5	141.6	142.9	140.2	174.6	304.9	297.4	274.7	**2,273.3**
Kansas	52.6	89.5	97.5	99.5	105.6	164.6	172.7	170.9	167.7	165.7	178.9	179.8	160.5	**1,805.3**
Kentucky	18.1	98.9	112.0	123.5	142.0	123.3	131.2	162.2	261.6	284.4	292.9	321.1	390.6	**2,462.0**
Louisiana	83.5	187.0	216.1	215.5	254.3	240.7	272.1	282.8	250.4	263.0	288.6	299.3	260.4	**3,113.7**
Maine	71.7	112.4	119.2	121.1	147.4	139.0	141.0	141.0	196.4	199.7	202.0	201.0	190.9	**1,982.7**
Maryland	128.3	234.0	327.6	335.1	359.3	392.5	406.1	411.6	402.9	405.6	506.7	575.5	546.5	**5,031.7**
Massachusetts	293.1	466.2	491.2	508.7	557.8	675.6	676.6	670.2	661.2	662.8	707.2	877.2	820.3	**8,068.1**
Michigan	525.0	798.3	829.0	846.7	888.5	1,072.7	1,124.6	1,367.4	1,379.9	1,358.7	1,330.3	1,314.8	1,223.3	**14,059.2**
Minnesota	420.6	398.1	500.0	524.0	544.0	428.2	343.9	335.8	571.8	592.5	574.4	560.3	544.9	**6,338.6**
Mississippi	280.0	157.0	245.7	276.1	273.0	213.5	155.4	160.2	165.9	166.1	167.1	184.8	247.0	**2,691.8**
Missouri	106.1	105.0	104.0	487.2	251.7	229.8	242.4	244.3	232.5	235.0	250.4	262.8	231.5	**2,982.6**
Montana	13.5	32.4	36.5	37.5	41.1	41.2	68.9	83.7	106.5	107.9	118.9	117.1	108.4	**913.6**
Nebraska	46.5	74.8	77.7	75.4	84.7	94.0	105.0	104.9	100.5	102.8	113.3	113.8	101.2	**1,194.7**
Nevada	55.7	87.3	94.3	98.2	101.0	97.4	160.5	167.9	165.6	166.6	172.5	160.1	143.4	**1,670.6**
New Hampshire	74.0	102.8	129.9	127.9	130.2	134.4	141.0	135.9	180.8	179.0	209.6	243.6	273.9	**2,063.0**
New Jersey	302.2	409.7	793.8	621.8	659.3	815.4	991.7	1,027.7	1,014.4	999.3	1,025.7	1,014.2	978.2	**10,653.4**
New Mexico	22.0	48.7	54.8	56.2	60.8	55.0	97.1	98.1	95.3	97.5	105.6	107.5	96.4	**995.0**
New York	656.9	1,226.6	1,421.2	1,775.8	1,965.3	1,744.3	1,764.3	1,749.5	1,684.3	1,709.4	1,792.9	2,244.5	2,061.8	**21,796.9**
North Carolina	44.3	149.6	166.6	180.1	205.5	176.1	186.4	188.0	301.9	376.5	388.8	395.2	391.0	**3,150.0**
North Dakota	22.4	37.9	42.2	42.0	44.4	39.2	41.1	41.5	42.0	43.4	57.3	59.7	52.8	**566.0**
Ohio	275.0	502.0	551.3	568.8	606.2	830.9	847.3	875.8	1,286.1	1,261.0	1,245.5	1,239.1	1,145.8	**11,234.9**
Oklahoma	65.2	112.1	121.0	124.1	128.8	116.9	121.4	170.9	253.2	264.4	310.1	333.6	310.7	**2,432.5**
Oregon	183.5	226.4	225.9	227.5	237.0	289.5	312.2	290.9	299.6	309.8	312.5	313.4	284.2	**3,512.5**
Pennsylvania	336.5	456.9	771.2	669.4	731.0	1,166.1	1,319.0	1,395.3	1,369.2	1,362.3	1,396.8	1,403.4	1,424.9	**13,801.9**
Rhode Island	61.8	93.5	99.9	102.1	127.9	134.5	156.1	175.5	165.5	161.0	165.3	179.3	182.2	**1,804.5**
South Carolina	31.3	81.9	94.4	96.3	106.9	93.1	99.4	101.7	96.3	98.0	110.0	116.6	102.4	**1,228.4**
South Dakota	19.9	35.6	38.7	39.8	41.6	40.6	48.2	48.6	47.0	65.2	84.8	89.9	81.8	**681.6**
Tennessee	80.8	78.7	334.7	224.6	244.4	246.7	263.6	267.7	257.8	275.3	417.3	463.4	422.1	**3,577.0**
Texas	926.9	1,543.1	1,360.6	1,455.0	1,502.0	1,195.0	966.4	990.7	1,008.0	1,518.1	1,987.2	1,687.6	1,691.3	**17,832.0**
Utah	42.6	67.1	71.4	69.7	77.9	75.1	81.6	82.7	83.8	82.9	97.4	95.5	90.4	**1,018.0**
Vermont	24.8	42.7	45.8	49.5	53.9	67.6	75.7	72.3	70.2	85.0	95.9	103.3	101.2	**887.9**
Virginia	15.7	109.9	133.0	139.3	156.7	133.8	144.6	241.9	291.4	295.2	298.9	315.2	280.0	**2,555.7**
Washington	258.5	347.0	371.6	361.4	448.8	455.3	453.4	459.3	543.6	542.2	592.9	579.6	545.5	**5,959.3**
West Virginia	34.2	74.3	83.4	86.0	94.0	94.3	153.6	154.5	159.4	159.9	180.9	190.0	175.1	**1,639.6**
Wisconsin	247.7	353.1	359.4	369.1	436.9	415.7	421.6	426.4	422.3	421.9	604.9	714.2	780.6	**5,973.9**
Wyoming	5.8	17.1	18.8	20.5	22.8	21.1	29.5	37.6	37.1	39.2	44.7	46.1	39.6	**379.8**
Total	**8,817.7**	**13,483.2**	**16,044.2**	**16,868.1**	**17,775.9**	**18,134.6**	**18,964.3**	**19,716.3**	**20,723.9**	**21,510.7**	**23,501.5**	**24,264.3**	**23,958.0**	**243,762.5**

* Revenues include state settlement revenues and net state cigarette tax collections. Revenues not reported include excise taxes collected on smokeless tobacco products, local excise taxes, and state or local sales taxes.
† Adjusted to fiscal year ending June 30.
§ Includes the District of Columbia.

Today, many state programs have experienced, and are facing, substantial state government cuts to tobacco control funding, resulting in the near elimination of tobacco control programs in those states (*6*). By 2010, states were appropriating only 2.4% of their state tobacco revenues for tobacco control. Reaching the *Best Practices* 2007 funding goal would have required an additional 13.0% of tobacco revenues, or $3.1 billion of the $24 billion collected, in 2010.

The findings in this report are subject to at least four limitations. First, the state settlement and tax revenues included in this report do not include other revenues such as excise taxes collected on smokeless tobacco products, local excise taxes, and state or local sales taxes. For state sales taxes alone, an estimated

TABLE 2. Total state and federal tobacco control appropriations (in millions of dollars) — United States, 1998–2010*

State†	1999 *Best Practices* funding recommendation (range)	2007 *Best Practices*§ funding recommendation	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010¶	(2010 as % of 2007 *Best Practices*)	Total 1998–2010
Alabama	26.74–71.24	56.7	0.5	1.1	1.6	5.9	2.8	1.6	1.7	1.5	1.8	2.1	2.2	2.6	2.2	(3.9)	**27.7**
Alaska	8.09–16.51	10.7	0.4	1.0	2.5	2.5	4.1	6.1	4.9	5.2	7.1	7.5	8.8	9.4	8.6	(80.4)	**68.1**
Arizona	27.79–71.10	68.1	28.4	32.7	35.3	34.8	36.8	18.6	25.8	23.3	20.5	26.0	24.0	21.7	23.4	(34.4)	**351.1**
Arkansas	17.91–46.45	36.4	0.4	0.9	1.2	17.3	8.1	17.7	18.7	18.7	18.8	16.7	17.0	17.2	19.8	(54.4)	**172.3**
California	165.10–442.40	441.9	160.6	106.0	88.5	114.9	134.9	88.7	90.3	90.1	80.3	84.2	77.9	78.9	79.0	(17.9)	**1,274.4**
Colorado	24.55–63.26	54.4	1.3	0.9	1.3	14.1	14.1	8.9	5.2	5.6	28.6	26.4	27.5	27.8	12.4	(22.8)	**174.2**
Connecticut	21.24–53.90	43.9	0.3	1.0	5.0	2.0	1.6	1.6	1.5	1.0	1.2	3.2	1.2	8.6	7.2	(16.4)	**35.4**
Delaware	8.63–18.46	13.9	0.3	0.7	0.8	3.6	5.8	5.8	10.8	10.0	9.9	11.0	11.4	11.4	10.8	(77.7)	**92.5**
District of Columbia	7.48–14.57	10.5	0.3	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.8	1.0	3.4	4.2	2.1	(20.0)	**14.9**
Florida	78.38–221.26	210.9	0.4	70.6	44.8	44.9	30.6	38.3	1.8	1.7	2.0	6.7	58.9	60.8	67.7	(32.1)	**428.9**
Georgia	42.59–114.34	116.5	0.5	1.8	1.6	17.4	22.3	20.7	14.2	12.9	3.8	3.5	3.4	3.5	3.2	(2.7)	**108.9**
Hawaii	10.78–23.45	15.2	0.4	0.8	4.5	10.5	1.9	11.2	9.7	9.7	6.8	10.4	11.4	11.5	8.8	(57.9)	**97.6**
Idaho	11.04–24.09	16.9	0.3	0.8	1.1	2.3	2.1	2.4	2.7	2.9	2.0	2.3	2.7	2.9	2.3	(13.6)	**26.8**
Illinois	64.91–179.05	157.0	0.7	1.6	1.7	30.2	48.4	13.7	13.7	12.7	12.4	9.8	9.8	9.9	9.7	(6.2)	**174.1**
Indiana	34.78–95.80	78.8	1.2	0.9	1.4	36.4	33.9	34.0	12.2	12.6	12.2	12.0	17.3	16.2	11.8	(15.0)	**202.2**
Iowa	19.35–48.71	36.7	0.3	0.8	0.9	10.3	10.4	6.1	6.0	5.9	6.7	7.6	13.4	11.5	11.1	(30.2)	**91.2**
Kansas	18.05–44.69	32.1	0.4	0.9	1.2	1.7	1.7	1.7	1.7	1.9	3.6	3.6	2.8	2.4	2.2	(6.9)	**25.8**
Kentucky	25.09–69.90	57.2	0.5	1.1	1.1	6.1	6.6	4.1	3.8	3.7	4.0	4.0	3.7	4.0	3.9	(6.8)	**46.7**
Louisiana	27.13–71.43	53.5	0.3	1.2	5.1	1.6	1.6	9.1	11.8	12.3	9.3	9.2	9.6	8.8	8.9	(16.6)	**89.0**
Maine	11.19–25.35	18.5	0.9	0.6	4.4	19.7	14.7	16.2	15.4	15.0	15.3	15.8	18.0	11.9	11.8	(63.8)	**159.5**
Maryland	30.30–78.60	63.3	0.4	1.1	1.4	31.4	22.4	31.4	16.6	10.7	10.7	20.1	19.9	20.9	6.7	(10.6)	**193.8**
Massachusetts	35.24–92.76	90.0	39.3	57.3	53.6	44.7	49.6	6.4	4.1	5.2	6.1	10.0	14.6	14.0	6.1	(6.8)	**310.9**
Michigan	54.80–154.56	121.2	1.6	1.2	1.7	1.7	1.7	1.8	6.6	6.7	5.8	5.5	5.4	5.5	4.5	(3.7)	**49.7**
Minnesota	28.62–74.01	58.4	3.6	0.8	16.2	35.4	30.1	33.7	21.6	19.8	23.5	23.0	23.4	21.8	21.5	(36.8)	**274.2**
Mississippi	18.79–46.80	39.2	0.3	19.7	31.4	20.4	20.5	20.4	20.4	20.3	20.6	0.7	8.6	11.1	11.7	(29.8)	**206.1**
Missouri	32.77–91.36	73.2	1.1	0.8	1.2	1.2	19.9	1.2	1.2	1.4	1.9	1.3	1.5	3.0	2.4	(3.3)	**37.9**
Montana	9.36–19.68	13.9	0.4	0.7	4.4	4.4	1.4	1.3	4.1	3.3	7.9	8.0	9.6	9.5	9.4	(67.6)	**64.3**
Nebraska	13.31–31.04	21.5	0.4	1.0	8.2	8.2	8.3	8.3	1.6	4.1	4.5	4.4	3.9	4.3	4.2	(19.5)	**61.4**
Nevada	13.48–32.99	32.5	0.3	0.8	4.6	3.8	5.0	5.0	5.0	5.1	5.4	4.8	2.9	4.5	3.8	(11.7)	**51.1**
New Hampshire	10.89–24.77	19.2	0.4	0.8	1.0	4.0	4.0	4.0	0.9	0.9	1.2	1.2	2.4	1.3	1.0	(5.2)	**23.1**
New Jersey	45.07–121.33	119.8	0.3	0.9	19.9	31.3	31.3	31.3	11.2	12.1	12.5	12.5	12.4	10.5	8.9	(7.4)	**194.9**
New Mexico	13.71–31.95	23.4	0.9	0.7	1.1	3.4	6.2	6.2	7.1	6.0	7.3	9.1	10.9	10.8	10.6	(45.3)	**80.3**
New York	95.83–269.30	254.3	1.9	8.8	31.3	34.5	42.0	42.0	41.8	42.3	56.0	87.6	86.3	79.5	67.5	(26.5)	**621.5**
North Carolina	42.59–118.63	106.8	1.7	1.2	1.7	1.7	6.8	8.0	7.9	27.7	23.9	19.0	18.9	18.9	20.0	(18.7)	**157.4**
North Dakota	8.16–16.55	9.3	0.4	0.8	1.1	1.1	3.4	3.6	4.5	4.1	4.4	4.4	4.4	4.4	9.4	(101.1)	**45.9**
Ohio	61.74–173.68	145.0	0.7	1.5	1.5	61.5	23.2	35.5	39.7	54.6	48.9	46.5	46.3	9.6	7.4	(5.1)	**376.9**
Oklahoma	21.83–56.31	45.0	0.5	1.2	1.3	3.1	2.8	6.7	7.9	6.0	10.0	11.5	15.7	19.5	21.1	(46.9)	**107.3**
Oregon	21.13–52.84	43.0	0.4	9.4	9.5	9.5	12.3	12.2	3.9	4.4	4.7	4.7	9.4	9.4	7.7	(17.9)	**97.5**
Pennsylvania	65.57–184.76	155.5	0.6	1.2	1.3	1.3	42.7	53.3	52.9	47.2	34.4	31.7	33.1	33.6	19.0	(12.2)	**352.2**
Rhode Island	9.89–21.91	15.2	1.0	0.7	1.7	3.4	5.4	4.4	4.1	3.5	3.5	2.4	2.3	2.2	1.9	(12.5)	**36.6**
South Carolina	23.91–62.01	62.2	1.0	0.7	1.2	3.0	2.8	3.2	1.2	1.1	1.3	3.3	3.3	1.4	3.2	(5.1)	**26.6**
South Dakota	8.69–18.21	11.3	0.3	0.6	0.9	2.6	3.6	1.7	1.6	2.3	1.8	1.8	6.1	6.0	6.0	(53.1)	**35.2**
Tennessee	32.23–89.08	71.7	0.4	1.2	1.4	1.4	1.4	1.4	1.3	1.4	1.7	1.7	11.4	6.4	1.5	(2.1)	**32.7**
Texas	103.29–284.74	266.3	0.6	0.7	8.5	10.8	13.1	13.5	9.3	9.5	10.1	8.6	12.1	13.2	13.3	(5.0)	**123.2**
Utah	15.23–33.38	23.6	0.3	0.9	1.2	5.2	7.2	8.3	8.2	8.3	8.6	8.6	8.6	8.5	8.3	(35.2)	**82.1**
Vermont	7.91–15.94	10.4	0.4	0.9	1.2	7.8	7.0	6.3	5.6	5.7	6.2	6.4	6.5	6.4	5.9	(56.7)	**66.3**
Virginia	38.87–106.85	103.2	0.9	0.8	14.2	18.1	20.4	23.3	18.5	13.6	13.9	14.7	15.7	13.9	13.4	(13.0)	**181.5**
Washington	33.34–89.38	67.3	1.3	0.9	3.8	16.9	18.9	27.7	27.6	28.4	28.8	28.8	28.7	28.8	17.2	(25.6)	**258.0**
West Virginia	14.16–35.37	27.8	0.8	0.6	1.1	7.0	6.8	7.0	7.0	6.9	7.1	6.7	7.0	7.0	6.9	(24.8)	**71.8**
Wisconsin	31.16–82.38	64.3	1.3	0.8	3.7	24.6	16.2	16.8	11.1	11.0	11.4	11.4	16.3	16.6	8.1	(12.6)	**149.4**
Wyoming	7.38–14.40	9.0	0.3	0.7	1.0	2.8	1.9	4.0	4.0	4.7	7.1	7.0	7.0	7.1	5.8	(64.4)	**53.3**
Total	**1,600.04–4,241.50**	**3,696.6**	**262.3**	**345.4**	**436.6**	**782.3**	**820.9**	**736.7**	**610.8**	**625.5**	**638.1**	**670.5**	**778.9**	**735.3**	**641.1**	**(17.3)**	**8,084.2**

* Adjusted to fiscal year ending June 30.
† Includes the District of Columbia.
§ Available at http://www.cdc.gov/tobacco/stateandcommunity/best_practices/index.htm.
¶ Does not include time-limited funding (e.g., Communities Putting Prevention to Work).

$4.2 billion was collected in fiscal year 2010 from the sale of cigarettes (*5*). Therefore, the ratios between tobacco revenues and appropriations in this report are underestimated. Second, annual state investments in tobacco control include only state and federal appropriations and not necessarily the total dollar amount spent by tobacco control programs in a given year because of program practice and multiyear appropriations. Third, appropriations reflect initial state commitments to tobacco funding, but do not ensure that expenditures are used for *Best Practices* purposes. Finally, these data do not reflect substantial funding cuts in state programs in fiscal years 2011 and 2012.

What is already known on this topic?

CDC's *Best Practices for Comprehensive Tobacco Control* recommends that all states invest a combined $3.7 billion annually in evidence-based, statewide tobacco control programs.

What is added by this report?

During 1998–2010, states collected $243.8 billion in total tobacco revenues from the Master Settlement Agreement and cigarette excise taxes. State and federal appropriations for tobacco control totaled $8.1 billion, whereas CDC's *Best Practices* recommended funding of $29.2 billion.

What are the implications for public health practice?

If all states were to use a greater portion of future tobacco revenues to fund tobacco control and prevention programs at the levels recommended by CDC they could achieve larger and more rapid reductions in smoking and associated morbidity, mortality, and health-care costs.

Although reductions in adult cigarette smoking rates have been observed in recent years, the amount and direction of change in adult smoking rates have not been consistent from year to year (*8*). States that have made larger sustained investments in comprehensive tobacco control programs have seen cigarette sales drop approximately twice as much as in the United States overall, and smoking prevalence among adults and youths has declined faster as spending for tobacco control programs has increased in Arizona, California, Massachusetts, Minnesota, Maine, New York, Oregon, and Washington (*2,3,9*).

Evidence indicates that tobacco control programs are potentially cost-saving (*2,3,9,10*). For example, when California increased its state excise tax by $0.25 per pack in 1988, approximately $0.05 per pack was dedicated to tobacco prevention programs (*2*). In the initial years, California came close to meeting 1999 *Best Practices* recommendations and has maintained relatively stable funding since then. Adult smoking rates in California declined from 22.7% in 1988 to 13.1% in 2009, and the tobacco control program has been associated with substantial reductions in personal health-care expenditures (*10*).

Thirteen years after the MSA, approximately 3,800 U.S. children try their first cigarette each day. Of that number, an estimated 1,000 will become daily smokers, and nearly 300 eventually will die from tobacco-related illness. The more that states invest in comprehensive tobacco control programs and implement high-impact policies (e.g., cigarette excise tax increases, comprehensive smoke-free policies, and counter-marketing campaigns), the greater the reduction in youth initiation, tobacco-related disease and death, and tobacco-related health care costs and lost productivity (*3,9,10*).

Acknowledgments

Kimp Walton, MS, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, CDC. Jidong Huang, PhD, Institute for Health Research and Policy, Univ of Illinois at Chicago.

References

1. CDC. Best practices for comprehensive tobacco control—1999. Atlanta, GA: US Department of Health and Human Services, CDC; 1999.
2. CDC. Best practices for comprehensive tobacco control programs—2007. Atlanta, GA: US Department of Health and Human Services, CDC; 2007. Available at http://www.cdc.gov/tobacco/stateandcommunity/best_practices/index.htm. Accessed May 17, 2012.
3. Institute of Medicine. Ending the tobacco problem: a blueprint for the nation. Washington, DC: The National Academies Press; 2007. Available at http://books.nap.edu/openbook.php?record_id=11795. Accessed May 21, 2012.
4. Jones WJ, Silvestri GA. The Master Settlement Agreement and its impact on tobacco use 10 years later: lessons for physicians about health policy making. Chest 2010;137:692–700.
5. Orzechowski W, Walker RC. The tax burden on tobacco. Vol. 45. Arlington, VA: Orzechowski and Walker; 2010.
6. Campaign for Tobacco Free Kids. A broken promise to our children: the 1998 state tobacco settlement 13 years later. Washington, DC: Campaign for Tobacco Free Kids; 2011. Available at http://www.tobaccofreekids.org/what_we_do/state_local/tobacco_settlement. Accessed December 9, 2011.
7. Niemeyer D, Miner KR, Carlson LM, Baer K, Shorty L. The 1998 Master Settlement Agreement: a public health opportunity realized—or lost? Health Promot Pract 2004;5(3 Suppl):21S–32S.
8. CDC. Vital Signs: current cigarette smoking among adults aged ≥18 years—United States, 2005–2010. MMWR 2011;60:1207–12.
9. Farrelly MC, Pechacek TF, Chaloupka FJ. The impact of tobacco control program expenditures on aggregate cigarette sales: 1981–2000. J Health Econ 2003;22:843–59.
10. Lightwood JM, Dinno A, Glantz SA. Effect of the California tobacco control program on personal health care expenditures. PLoS Med 2008;5:e178.

Work-Related Asthma — 38 States and District of Columbia, 2006–2009

Work-related asthma (WRA) includes work-exacerbated asthma (preexisting or concurrent asthma worsened by factors related to the workplace environment) and occupational asthma (new onset asthma attributed to the workplace environment) (*1,2*). WRA is a preventable occupational lung disease associated with serious adverse health and socioeconomic outcomes (*1,2*). Among workers with similar occupational exposures, WRA diagnosis offers unique opportunities for prevention (*2,3*). The American Thoracic Society estimated that 15% of U.S. adults with asthma have asthma attributable to occupational factors (*3*). State-level information on the proportion of asthma that is WRA is limited but could be useful to prioritize and guide investigations and interventions. To estimate current asthma prevalence and the proportion of asthma that is WRA, CDC analyzed data from the 2006–2009 Behavioral Risk Factor Surveillance System (BRFSS) from 38 states and the District of Columbia (DC). This report summarizes the results of that analysis, which indicated that among ever-employed adults with current asthma, the overall proportion of current asthma that is WRA was 9.0%. State-specific proportions of asthma that are WRA ranged from 4.8% to 14.1%. Proportions of WRA were highest among persons aged 45–64 years (12.7%), blacks (12.5%), and persons of other races (11.8%). These findings provide a baseline that state and national health agencies can use to monitor the proportion of WRA among persons with current asthma. Enhancing WRA surveillance through routine collection of industry and occupation information will greatly increase understanding of WRA.

BRFSS is a state-based, random-digit–dialed telephone survey of the noninstitutionalized U.S. civilian population aged ≥18 years. The survey collects information on health risk behaviors, preventive health practices, health-care access, and disease status.* In 2005, the Asthma Call-Back Survey (ACBS)† was pilot tested in three states and has been conducted every year since. ACBS collects detailed information on asthma, including data on asthma symptoms, health-care utilization, medication use, knowledge of asthma, cost of asthma care, work-related asthma, comorbid conditions, and complementary and alternative medicine use for asthma. BRFSS respondents are eligible to participate in ACBS if they answer "yes" to the question, "Have you ever been told by a doctor, nurse, or other health professional that you had asthma?" Those who agree are contacted to participate in ACBS within 2 weeks of the BRFSS completion date. Data from BRFSS and ACBS for 2006–2009 from 38 states and DC are included in this analysis. The Council of American Survey and Research Organizations median response rates among the 38 states and DC ranged from 47.5% in 2007 to 51.4% in 2009 for BRFSS and from 47.2% in 2009 to 54.3% in 2007 for ACBS.

For this analysis, participants in BRFSS and ACBS who responded "yes" to the questions, "Have you ever been told by a doctor, nurse, or other health professional that you had asthma?" and "Do you still have asthma?" were listed as having current asthma. ACBS participants were considered to be ever-employed if they indicated that they currently were "employed full-time" or "employed part-time" or that they had ever been employed outside the home. Ever-employed adults with current asthma who responded "yes" to the question, "Were you ever told by a doctor or other health professional that your asthma was related to any job you ever had?" were classified as having WRA.

Combined data for 2006–2009 were weighted to account for unequal probability of sample selection and nonresponse differences in the sample.§ For states with multiple years of data, annual weights were proportionately adjusted based on the number of years and the sample size in each year. Statistical software was used to calculate estimates and 95% confidence intervals (CIs), accounting for the complex survey design. Statistically significant differences in distribution were determined using the Rao-Scott chi-square test of independence ($p \leq 0.05$).

During 2006–2009, in the 38 states and DC included in the analysis, 1,082,135 adults participated in BRFSS (representing an estimated annual average of 198 million adults), and 56,097 adults participated in ACBS (representing an estimated annual average of 26 million adults). During this period, an estimated 8.4% of adults had current asthma. The prevalence of current asthma significantly differed by age, sex, and race/ethnicity.¶ Prevalence was lowest among persons aged ≥65 years (7.6%), men (6.3%), and Hispanics (6.3%) (Table). State-specific estimates of the prevalence of current asthma ranged from 6.3% to 10.4% (Table).

A total of 38,306 adults who participated in ACBS were ever-employed and had current asthma, representing an estimated 16 million adults in the 38 states and DC. Of these, the estimated proportion who had WRA was 9.0% (representing an

* Additional information and survey questions available at http://www.cdc.gov/brfss.

† Additional information and survey questions available at http://www.cdc.gov/asthma/survey/brfss.html#callback and http://www.cdc.gov/brfss/acbs/index.htm.

§ Additional information available at http://www.cdc.gov/brfss/pdf/userguide.pdf.

¶ Persons identified as Hispanic might be of any race. Persons identified as white, black, or other race are all non-Hispanic.

TABLE. Prevalence of current asthma[*] in adults and proportion of ever-employed[†] adults with current asthma who have been told by a health professional that their asthma was work related,[§] by state and selected characteristics — Behavioral Risk Factor Surveillance System (BRFSS), Asthma Call-Back Survey (ACBS), United States, 2006–2009

	Adults				Ever-employed[†] adults with current asthma			
			Prevalence of current asthma				Proportion with work-related asthma	
Characteristic	No. in sample[¶]	Weighted no. (in thousands)[**]	%[**]	(95% CI)	No. in sample[¶]	Weighted no. (in thousands)[**]	%[**]	(95% CI)
Total	**1,082,135**	**198,634**	**8.4**	**(8.3–8.5)**	**38,306**	**16,192**	**9.0**	**(8.4–9.6)**
Age group (yrs)[††§§]								
18–44	310,293	98,673	8.6	(8.4–8.8)	9,637	8,089	6.9	(6.0–7.8)
45–64	446,365	65,329	8.6	(8.4–8.7)	18,402	5,716	12.7	(11.6–13.7)
≥65	315,814	33,434	7.6	(7.4–7.7)	10,113	2,353	7.5	(6.5–8.4)
Sex[††]								
Men	412,560	96,676	6.3	(6.2–6.5)	10,199	6,018	9.1	(8.1–10.1)
Women	669,575	101,958	10.3	(10.2–10.5)	28,107	10,173	8.9	(8.2–9.7)
Race/Ethnicity[††§§¶¶]								
White	859,837	131,841	8.7	(8.6–8.8)	31,660	12,254	8.2	(7.6–8.8)
Black	64,650	17,586	9.8	(9.3–10.3)	2,069	1,360	12.5	(9.8–15.2)
Hispanic	81,402	33,268	6.3	(6.0–6.7)	1,599	1,028	10.5	(7.7–13.4)
Other race	65,426	14,321	8.8	(8.3–9.3)	2,694	1,091	11.8	(9.1–14.5)
State								
Alaska	4,665	479	8.6	(7.5–9.7)	222	28	—[***]	—
Arizona	21,187	4,646	9.6	(8.8–10.5)	551	451	4.8	(2.5–7.1)
California	40,388	27,662	7.9	(7.6–8.3)	1,328	2,308	8.9	(6.9–11.0)
Colorado	18,012	3,548	7.8	(7.3–8.3)	536	251	7.2	(4.6–9.8)
Connecticut	28,675	2,874	9.2	(8.6–9.7)	1,037	242	8.0	(5.7–10.2)
District of Columbia	16,127	462	9.7	(9.1–10.3)	514	42	5.9	(3.6–8.1)
Florida	62,478	14,342	6.4	(6.0–6.8)	1,260	899	14.1	(9.6–18.6)
Georgia	27,024	6,985	7.7	(7.3–8.2)	870	518	11.3	(8.1–14.5)
Hawaii	26,296	993	8.8	(8.3–9.3)	1,068	88	8.1	(5.8–10.4)
Illinois	16,244	9,679	8.4	(7.8–9.0)	618	782	6.9	(4.8–9.0)
Indiana	26,721	4,754	8.9	(8.4–9.4)	1,222	428	11.7	(9.1–14.2)
Iowa	22,901	2,302	7.0	(6.6–7.5)	848	155	7.5	(5.4–9.6)
Kansas	44,339	2,087	8.5	(8.1–8.9)	2,021	177	8.6	(6.9–10.2)
Louisiana	8,882	3,345	6.3	(5.6–7.1)	180	220	—[***]	—
Maine	25,740	1,051	10.4	(9.9–10.9)	1,145	108	9.5	(7.4–11.6)
Maryland	35,809	4,280	8.9	(8.5–9.4)	1,160	361	8.7	(6.5–10.9)
Massachusetts	71,545	4,989	10.0	(9.6–10.4)	924	480	5.2	(3.4–7.0)
Michigan	31,874	7,663	9.8	(9.3–10.2)	1,676	750	12.5	(10.0–15.0)

See table footnotes on page 377.

estimated annual average of 1.4 million adults). Distributions of the proportion of WRA differed significantly by age and race/ethnicity and were highest among persons aged 45–64 years (12.7%), blacks (12.5%), and persons of other races (11.8%) (Table). The estimated proportion of ever-employed adults with current asthma who had WRA was similar among men (9.1%) and women (8.9%). By state, the estimated proportions of ever-employed adults with current asthma who reported WRA ranged from 4.8% to 14.1% (Table).

Reported by

Gretchen E. Knoeller, MPH, Jacek M. Mazurek, MD, Div of Respiratory Disease Studies, National Institute for Occupational Safety and Health; Jeanne E. Moorman, MS, Div of Environmental Hazards and Health Effects, National Center for Environmental Health, CDC. ***Corresponding contributor:*** *Gretchen E. Knoeller, gknoeller@cdc.gov, 304-285-5838.*

Editorial Note

The results of this analysis indicate that exposures in the workplace continue to contribute to asthma morbidity among adults in the United States and that blacks with asthma appear to be affected disproportionately by occupational conditions. Among adults who have ever been employed, an estimated annual average of 1.4 million WRA cases could have been prevented. These findings are consistent with the estimated proportion of adult asthma that is WRA reported from the 2005 ACBS in Michigan (7.6% [CI = 4.9%–10.3%]), Minnesota (5.6% [CI = 2.9%–8.2%]), and Oregon (9.0% [CI = 6.7%–11.4%]) (*4*).

Strategies to reduce or eliminate workplace exposures for persons with WRA range from substitution of chemicals to engineering and administrative controls and will aid in the prevention of new cases and slow the progression of subclinical cases in the same workplace (*2,5*). For example, in the early 1990s, health-care workers and other workers exposed to

TABLE. (*Continued*) Prevalence of current asthma* in adults and proportion of ever-employed† adults with current asthma who have been told by a health professional that their asthma was work related,§ by state and selected characteristics — Behavioral Risk Factor Surveillance System (BRFSS), Asthma Call-Back Survey (ACBS), United States, 2006–2009

	Adults				Ever-employed† adults with current asthma			
			Prevalence of current asthma				Proportion with work-related asthma	
Characteristic	No. in sample¶	Weighted no. (in thousands)**	%**	(95% CI)	No. in sample¶	Weighted no. (in thousands)**	%**	(95% CI)
Missouri	15,812	4,468	8.5	(7.9–9.2)	727	372	7.9	(4.6–11.2)
Montana	26,518	740	8.8	(8.3–9.3)	966	62	11.0	(8.1–13.8)
Nebraska	51,154	1,334	7.5	(7.0–8.0)	1,745	96	8.5	(6.3–10.6)
Nevada	12,736	1,939	8.2	(7.4–9.0)	519	164	13.7	(6.8–20.6)
New Hampshire	24,914	1,027	10.2	(9.7–10.7)	1,026	105	7.8	(5.5–10.0)
New Jersey	24,130	6,672	8.1	(7.6–8.7)	657	518	8.1	(5.3–11.0)
New Mexico	21,670	1,482	8.6	(8.1–9.2)	708	121	9.6	(6.4–12.7)
New York	27,295	14,843	9.0	(8.5–9.4)	1,154	1,319	9.6	(7.2–12.0)
North Dakota	9,802	494	8.4	(7.6–9.2)	386	41	9.6	(6.1–13.1)
Ohio	33,965	8,752	9.5	(9.0–10.0)	1,000	805	8.7	(6.1–11.4)
Oklahoma	23,121	2,732	9.2	(8.7–9.7)	823	254	10.6	(7.8–13.3)
Oregon	18,910	2,876	9.8	(9.2–10.4)	1,019	261	7.8	(5.8–9.8)
Pennsylvania	13,231	9,693	9.3	(8.3–10.4)	205	814	7.9	(3.8–12.1)
Rhode Island	11,082	827	10.3	(9.5–11.1)	560	91	8.0	(4.5–11.6)
Texas	46,426	17,278	7.4	(7.0–7.8)	1,302	1,194	7.9	(5.8–10.1)
Utah	20,570	1,858	8.1	(7.6–8.7)	880	147	6.7	(4.7–8.6)
Vermont	27,367	493	9.7	(9.2–10.1)	1,532	49	8.9	(6.9–10.9)
Virginia	10,494	5,970	8.5	(7.6–9.5)	392	555	9.6	(5.9–13.2)
Washington	92,467	4,438	9.1	(8.9–9.4)	3,933	426	7.0	(6.0–8.0)
West Virginia	13,430	1,437	9.1	(8.5–9.7)	696	120	13.7	(10.3–17.2)
Wisconsin	23,894	4,290	9.3	(8.7–9.9)	896	392	8.4	(6.1–10.8)

Abbreviation: CI = confidence interval.

* Based on a "yes" response to the questions, "Have you ever been told by a doctor or other health professional that you have asthma?" and "Do you still have asthma?"

† Current employment status was defined as "employed full-time" or "employed part-time," or based on a "yes" response to the question, "Have you ever been employed outside the home?"

§ Based on a "yes" response to the question, "Were you ever told by a doctor or other health professional that your asthma was related to any job you ever had?"

¶ Unweighted sample size.

** Weighted to the state population using the survey sample weights for each BRFSS and ACBS participant.

†† For current asthma: Rao-Scott chi-square test; p-value <0.01.

§§ For work-related asthma: Rao-Scott chi-square test; p-value <0.01.

¶¶ Persons identified as Hispanic might be of any race. Persons identified as white, black, or other race are all non-Hispanic.

*** Relative standard error >0.30; estimate suppressed.

powdered, non–rubber latex gloves experienced high incidence of WRA. After recommendations were made to change the type of glove used and to reduce the powder and non–rubber latex protein content of the gloves if they needed to be used, considerable reductions in the occurrence of WRA were observed in the health-care industry (*5*). Another example is the substantial reduction in WRA prevalence among workers in the detergent industry after detergent enzymes were encapsulated during the production process to reduce exposure (*5*).

Continued administration of ACBS will allow state asthma programs to monitor the proportion of asthma that is WRA. Information on WRA respondents' industry and occupation is necessary to guide the development of successful intervention strategies. WRA management and prevention includes a public health aspect (i.e., workplaces suspected to pose a high risk for development of WRA should be investigated, and appropriate exposure control measures should be implemented to prevent WRA) (*1*).

The findings in this report are subject to at least six limitations. First, results likely are underestimates of the actual proportion of WRA because WRA is underdiagnosed in the United States (*6,7*). Second, ACBS might be subject to selection bias because BRFSS respondents with asthma were asked if they agreed to be called back for ACBS. Those who agreed to participate in ACBS might have more severe asthma or might be more likely to attribute asthma to their work (*8*). No information on asthma symptoms or work-relatedness was available in BRFSS for those who refused to participate. Third, BRFSS was not designed to allow assessment of the prevalence of current asthma among ever-employed adults. Therefore, findings on the prevalence of current asthma and the proportion of current asthma that is WRA were determined based on different denominator populations and should be interpreted with caution. Fourth, no information on industry and occupation was available for these participants. Information on industry and occupation for WRA cases is limited because

What is already known on this topic?

Work-related asthma, one of the most common occupational lung diseases, is preventable but often undiagnosed.

What is added by this report?

These results indicate that an estimated annual average of 1.4 million cases of adult asthma (9.0% of current asthma cases among ever-employed adults) could have been prevented and that ever-employed blacks with current asthma are disproportionately affected by work-related asthma.

What are the implications for public health practice?

Enhancing surveillance for work-related asthma through routine collection of data on industry, occupation, and workplace exposures could greatly expand understanding of potential causes and triggers. Such information could be useful to state and local health departments to guide investigation and prevention efforts, such as the use of engineering and administrative controls to diminish the current burden of work-related asthma.

CDC's sentinel-event surveillance currently is conducted only in selected states (*9*). Fifth, exclusive use of landline telephones in some years might mean some groups are underrepresented in the sample (*10*). Finally, because ACBS had low response rates and data are limited to the 38 states and DC that conducted the survey, these estimates are not generalizable to the entire U.S. population and do not represent the populations of nonparticipating states.

Currently, CDC provides technical and financial assistance to five states (California, Massachusetts, Michigan, New Jersey, and New York) to conduct expanded WRA surveillance.** These systems collect in-depth, case-based information on WRA cases, including workplace exposure and employment information, but do not allow assessment of WRA burden in the population. For many states, ACBS provides the only state-based estimates of WRA, and some states already have initiated the collection of information on industry and occupation in BRFSS. In 2013, CDC will sponsor a BRFSS optional module designed to collect respondents' current industry and occupation information.

** Information on WRA surveillance programs from CDC-funded states is available at http://www.cdc.gov/niosh/topics/surveillance/ords/statebasedsurveillance/wra.html.

Expanding surveillance for WRA to include collection of information on industry and occupation will increase understanding of WRA epidemiology. These important additions will enable states, other government agencies, health professionals, employers, workers, and worker representatives to target intervention and prevention efforts more effectively to reduce the burden of WRA.

Acknowledgments

BRFSS state coordinators. Kitty H. Gelberg, PhD, New York State Dept of Health. Lee Petsonk, MD, National Institute for Occupational Safety and Health, CDC.

References

1. Friedman-Jimenez G, Beckett WS, Szeinuk J, et al. Clinical evaluation, management, and prevention of work-related asthma. Am J Ind Med 2000;37:121–41.
2. Tarlo SM, Balmes J, Balkissoon R, et al. Diagnosis and management of work-related asthma: American College of Chest Physicians consensus statement. Chest 2008;134(3 Suppl):1S–41S.
3. Balmes J, Becklake M, Blanc P, et al. American Thoracic Society statement: occupational contribution to the burden of airway disease. Am J Respir Crit Care Med 2003;167:787–97.
4. Lutzker LA, Rafferty AP, Brunner WM, et al. Prevalence of work-related asthma in Michigan, Minnesota, and Oregon. J Asthma 2010; 47:156–61.
5. Liss GM, Nordman H, Tarlo SM, Bernstein DI. Prevention and surveillance. In: Bernstein IL, Chan-Yeung M, Malo J, Bernstein DI, eds. Asthma in the workplace. 3rd ed. New York, NY: Taylor & Francis Group; 2006:353–75.
6. Henneberger PK, Kreiss K, Rosenman KD, et al. An evaluation of the incidence of work-related asthma in the United States. Int J Occup Environ Health 1999;5:1–8.
7. Sama SR, Milton DK, Hunt PR, et al. Case-by-case assessment of adult-onset asthma attributable to occupational exposures among members of a health maintenance organization. J Occup Environ Med 2006; 48:400–7.
8. Menzies D, Nair A, Williamson PA, et al. Respiratory symptoms, pulmonary function, and markers of inflammation among bar workers before and after a legislative ban on smoking in public places. JAMA 2006;296:1742–8.
9. CDC. Work-related lung disease surveillance system (eWoRLD). Asthma. Cincinnati, OH: US Department of Health and Human Services, CDC, National Institute for Occupational Safety and Health; 2008. Available at http://www2a.cdc.gov/drds/worldreportdata/sectiondetails.asp?archiveid=1&sectiontitleid=9. Accessed May 21, 2012.
10. Hu SS, Balluz L, Battaglia MP, et al. Improving public health surveillance using a dual-frame survey of landline and cell phone numbers. Am J Epidemiol 2001;173:703–11.

Prevalence of Stroke — United States, 2006–2010

In 2008, mortality from stroke was the fourth leading cause of death in the United States, and stroke was a leading cause of long-term severe disability (*1*). Nearly half of older stroke survivors experience moderate to severe disability (*2*). Care for stroke survivors cost an estimated $18.8 billion in the United States during 2008, and lost productivity and premature mortality cost an additional $15.5 billion (*3*). A 3.6% decline in stroke mortality during 2007–2008 (*1,4*) means that the prevalence of stroke (defined in this report as the percentage of noninstitutionalized persons who have ever experienced stroke) will increase if stroke incidence and the mean length of post-stroke survival does not decrease and the proportion of institutionalized stroke survivors does not change. Measuring the prevalence of stroke at the state level enables CDC and state health officials to target resources to populations or regions with high prevalence. A previous report of state-level stroke prevalence used 2005 Behavioral Risk Factor Surveillance System (BRFSS) data (*5*). To measure recent trends in stroke prevalence by sociodemographic characteristics and state of residence, CDC analyzed 2006–2010 data from BRFSS. This report describes the results of that analysis, which indicated that during this period, overall self-reported stroke prevalence did not change. However, consistent with findings in the previous report, there were disparities in stroke prevalence identified by age, race/ethnicity, and level of education (*4*). Specifically, older adults, blacks, American Indians/Alaska Natives, persons with lower levels of education, and persons living in the southeastern United States had higher stroke prevalence.

BRFSS is a state-based surveillance system. Each year, state health departments (with assistance from CDC) conduct random-digit–dialed, landline telephone surveys of the noninstitutionalized civilian population aged ≥18 years in all 50 states, the District of Columbia (DC), Puerto Rico, Guam, and the U.S. Virgin Islands.* Median response rates during 2006–2010 ranged from 50.6% to 54.6%. Since 2005, the core component of the survey has included a cardiovascular disease section, which includes one question related to stroke: "Has a doctor, nurse, or other health professional ever told you that you had stroke?" Participants who answered "yes" to this question were defined as having self-reported stroke. Participants were excluded if they answered "don't know" or refused to answer this question. Stroke prevalence was calculated based on the proportion of the population answering "yes." Data on the following sociodemographic characteristics were obtained from BRFSS core questions and included in this analysis: age group (18–44 years, 45–64 years, and ≥65 years), sex, race/ethnicity (white, black, Hispanic, Asian or Native Hawaiian/Other Pacific Islander [Asian/NHOPI], and American Indian/Alaska Native),† level of education, and state of residence.

Data analyses were conducted using statistical software. Sample weights were applied in all analyses to account for the probability of nonresponse and noncoverage in the complex sampling design. Age-adjusted prevalence of stroke was estimated using the 2000 U.S. standard population (*6*). Linear trends across survey periods were assessed using orthogonal polynomial coefficients, and results with a p-value <0.05 were considered significant.

The total number of BRFSS participants ranged from 347,790 in 2006 to 444,927 in 2010 from all 50 states and DC. The sample size for states (including DC) ranged from 1,964 (Alaska, 2010) to 39,549 (Florida, 2007).

Age-adjusted prevalence of stroke was 2.7% in 2006 and 2.6% in 2010 (p for trend = 0.05). A nearly 10-fold difference in stroke prevalence estimates was observed between persons aged ≥65 years and those aged 18–44 years, and this pattern appeared to be consistent over the entire study period (Table 1). Among racial/ethnic groups, age-adjusted prevalence was highest among American Indians/Alaska Natives and lowest among Asians/NHOPIs. Age-adjusted prevalence was higher among adults with a lower level of education compared with those with a higher level of education. From 2006 to 2010, no statistically significant change in stroke prevalence was observed among women or among any particular age group, race/ethnicity, or level of education. For men, prevalence declined from 2.8% in 2006 to 2.5% in 2009, and then increased to 2.7% in 2010 (p for trend <0.01) (Table 1).

In 2006, age-adjusted stroke prevalence ranged from 1.8% (Colorado, Massachusetts, North Dakota and Vermont) to 4.4% (Alabama). In 2010, age-adjusted stroke prevalence ranged from 1.5% in Connecticut to 4.1% in Alabama (Table 2). From 2006 to 2010, only two states had a significant decline in stroke prevalence: Georgia, from 3.3% to 2.8% (p for trend <0.01) and South Dakota, from 2.2% to 1.8% (p for trend = 0.04). In 2010, the states with higher stroke prevalence generally were states in the southeastern United States and Nevada (Figure).

* Additional information available at http://www.cdc.gov/brfss.

† Persons identified as Hispanic might be of any race. Persons identified as white, black, or other race are all non-Hispanic.

TABLE 1. Age-adjusted prevalence* of stroke among noninstitutionalized adults aged ≥18 years,† by selected characteristics — Behavioral Risk Factor Surveillance System, United States, 2006–2010

Characteristic	2006		2007		2008		2009		2010		p-value for linear trends	% change from 2006 to 2010
	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)		
Total	**2.7**	**(2.6–2.8)**	**2.6**	**(2.5–2.7)**	**2.6**	**(2.5–2.7)**	**2.4**	**(2.4–2.5)**	**2.6**	**(2.6–2.7)**	**0.05**	**-3.7**
Age group (yrs)												
18–44	0.7	(0.6–0.8)	0.7	(0.6–0.8)	0.7	(0.6–0.8)	0.6	(0.5–0.7)	0.7	(0.7–0.8)	0.86	0.0
45–64	2.9	(2.7–3.1)	2.8	(2.7–3.0)	2.8	(2.7–2.9)	2.7	(2.6–2.8)	2.9	(2.8–3.0)	0.62	0.0
≥65	8.4	(8.1–8.8)	8.4	(8.1–8.7)	8.4	(8.1–8.7)	7.9	(7.7–8.2)	8.3	(8.0–8.5)	0.09	-1.2
Sex												
Men	2.8	(2.7–3.0)	2.8	(2.6–2.9)	2.6	(2.5–2.7)	2.5	(2.4–2.6)	2.7	(2.6–2.8)	<0.01	-3.6
Women	2.5	(2.4–2.7)	2.5	(2.4–2.6)	2.6	(2.5–2.7)	2.4	(2.3–2.5)	2.6	(2.5–2.7)	0.68	4.0
Race/Ethnicity§												
White	2.4	(2.4–2.5)	2.4	(2.3–2.5)	2.3	(2.3–2.4)	2.2	(2.2–2.3)	2.4	(2.3–2.5)	0.13	0.0
Black	3.7	(3.3–4.1)	4.1	(3.8–4.5)	4.1	(3.8–4.4)	3.7	(3.3–4.0)	3.9	(3.6–4.2)	0.93	5.4
Hispanic	2.5	(2.1–3.0)	2.9	(2.4–3.5)	2.7	(2.3–3.1)	2.6	(2.2–3.0)	2.5	(2.3–2.9)	0.75	0.0
Asian/NHOPI	2.3	(1.5–3.6)	1.5	(1.0–2.2)	1.6	(1.1–2.3)	1.5	(1.1–2.1)	1.5	(1.2–1.9)	0.20	-34.8
AI/AN	5.5	(4.0–7.4)	5.3	(4.4–6.5)	5.6	(4.6–6.9)	4.4	(3.6–5.4)	5.9	(4.6–7.6)	0.99	7.3
Education												
Less than high school diploma	5.0	(4.5–5.6)	4.2	(3.8–4.5)	4.5	(4.2–4.9)	4.1	(3.8–4.4)	4.6	(4.2–4.9)	0.19	-8.0
High school diploma	2.9	(2.7–3.1)	3.0	(2.8–3.2)	2.9	(2.8–3.1)	2.6	(2.5–2.8)	3.0	(2.9–3.2)	0.92	3.4
Some college	2.5	(2.3–2.7)	2.7	(2.5–2.9)	2.6	(2.5–2.7)	2.5	(2.4–2.6)	2.7	(2.6–2.9)	0.28	8.0
College degree or higher	1.8	(1.7–2.0)	1.7	(1.6–1.9)	1.7	(1.6–1.8)	1.7	(1.6–1.9)	1.7	(1.6–1.8)	0.32	-5.6

Abbreviation: CI = confidence interval; NHOPI = Native Hawaiian/Other Pacific Islander; AI/AN = American Indian/Alaska Native.
* 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 a stroke?" Refused, "don't know," and missing responses were excluded from analyses.
§ Persons identified as Hispanic might be of any race. Persons identified as white, black, or other race are all non-Hispanic.

Reported by

Jing Fang, MD, Kate M. Shaw, MS, Mary G. George, MD, Div for Heart Disease and Stroke Prevention, National Center for Chronic Disease Prevention and Health Promotion, CDC. ***Corresponding contributor:*** *Jing Fang, jfang@cdc.gov, 770-488-5142.*

Editorial Note

In 2007, CDC reported state-specific stroke prevalence based on BRFSS data for 2005 (*5*). That report showed large disparities by sex, race/ethnicity, education, and state of residence in the prevalence of stroke. During the past 5 years, the age-adjusted prevalence of stroke marginally declined, from 2.7% to 2.6%. However, for men and for the states of Georgia and South Dakota, significant declines occurred. No other report on recent trends of stroke prevalence in the United States is available; however, one report demonstrated that stroke hospitalizations declined from 1997 to 2004 (*7*). The Framingham Heart Study (which predominantly included whites) showed that, during the past 50 years, annual incidence of stroke has declined, but lifetime risk for stroke declined at a slower rate (*8*). A similar decline in stroke incidence has not been observed among blacks (*9*).

The prevalence of stroke depends on incidence, mortality, and mean length of survival after stroke. During 2006–2010, stroke mortality declined continuously (*3*). However, no incidence data were reported for this period. The percentage of institutionalized stroke survivors actually might have increased; trends in stroke hospitalization data show that the percentage of stroke patients discharged to long-term–care facilities increased from 1988 to 2004 (*7*).

Because no national surveillance of stroke incidence exists in the United States, prevalence data can provide some evidence of disparities in stroke incidence. American Indians/Alaska Natives and blacks had higher stroke prevalence than other racial/ethnic groups. Persons with lower levels of education had higher stroke prevalence. These disparities have not decreased since 2005 (*5*). Similar to trends observed in stroke mortality,§ the southeastern region had a higher prevalence of stroke than other regions of the United States. Hypertension is the leading risk factor for stroke and is more prevalent in the southeastern region of the United States (*10*). Increased clinical and community action to control hypertension is needed not only to reduce the incidence of stroke but to eliminate disparities in stroke incidence.

§ Additional information available at http://www.cdc.gov/dhdsp/atlas/stroke_mortality_atlas/index.htm.

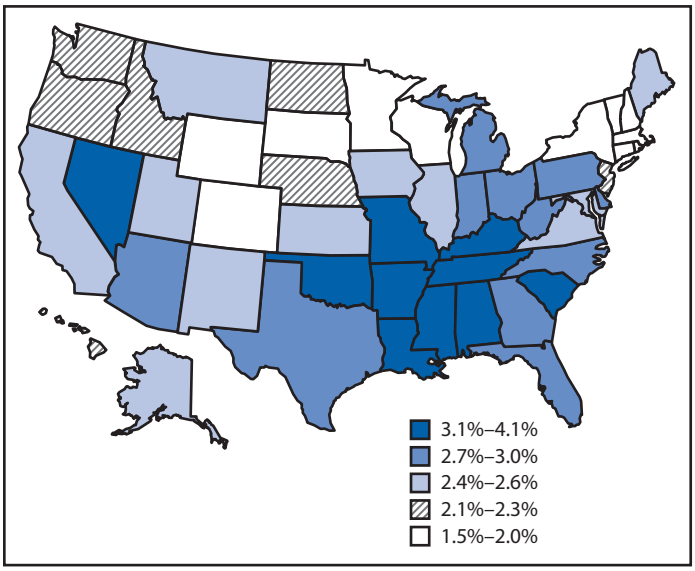
TABLE 2. Age-adjusted prevalence* of stroke among noninstitutionalized adults aged ≥18 years,† by state — Behavioral Risk Factor Surveillance System, United States, 2006–2010

State	2006		2007		2008		2009		2010		p-value for linear trends	% change from 2006 to 2010
	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)		
Alabama	4.4	(3.8–5.1)	3.5	(3.0–4.0)	4.0	(3.5–4.7)	3.4	(2.9–3.9)	4.1	(3.6–4.7)	0.40	-6.8
Alaska	3.1	(2.2–4.4)	2.3	(1.5–3.5)	2.7	(2.0–3.7)	2.5	(1.8–3.5)	2.6	(1.7–3.9)	0.63	-16.1
Arizona	2.7	(2.2–3.3)	2.8	(2.2–3.5)	2.4	(2.0–3.0)	2.5	(2.1–3.0)	2.7	(2.3–3.3)	0.79	0.0
Arkansas	3.3	(2.8–3.8)	2.9	(2.5–3.4)	3.2	(2.8–3.7)	3.3	(2.8–3.9)	3.4	(2.6–4.3)	0.59	3.0
California	2.8	(2.3–3.3)	2.5	(2.1–2.9)	2.3	(2.0–2.6)	2.4	(2.1–2.7)	2.4	(2.2–2.7)	0.17	-14.3
Colorado	1.8	(1.5–2.1)	2.0	(1.8–2.3)	2.0	(1.8–2.3)	1.5	(1.3–1.7)	1.8	(1.6–2.1)	0.25	0.0
Connecticut	1.9	(1.6–2.2)	1.6	(1.3–1.9)	1.9	(1.6–2.3)	1.5	(1.2–1.7)	1.5	(1.2–1.8)	0.06	-21.1
Delaware	2.6	(2.0–3.3)	2.4	(1.9–3.0)	2.7	(2.2–3.3)	2.6	(2.1–3.2)	2.7	(2.2–3.3)	0.67	3.8
District of Columbia	2.9	(2.4–3.6)	2.7	(2.2–3.4)	2.7	(2.3–3.3)	2.7	(2.2–3.2)	3.3	(2.7–4.0)	0.50	13.8
Florida	2.9	(2.5–3.3)	2.7	(2.4–3.0)	2.8	(2.3–3.3)	2.4	(2.1–2.8)	2.8	(2.5–3.2)	0.61	-3.4
Georgia	3.3	(2.8–3.8)	3.4	(2.9–4.0)	2.7	(2.4–3.2)	2.4	(2.0–2.8)	2.8	(2.4–3.2)	<0.01	-15.2
Hawaii	2.5	(2.1–3.0)	2.3	(1.9–2.7)	2.5	(2.1–3.0)	2.2	(1.8–2.6)	2.2	(1.9–2.7)	0.39	-12.0
Idaho	2.4	(2.0–2.8)	2.5	(2.1–3.1)	2.3	(1.9–2.7)	2.5	(2.1–3.1)	2.2	(1.8–2.6)	0.55	-8.3
Illinois	2.2	(1.9–2.7)	2.8	(2.3–3.4)	2.7	(2.3–3.1)	2.4	(2.0–2.8)	2.6	(2.1–3.1)	0.73	18.2
Indiana	2.7	(2.3–3.1)	2.9	(2.4–3.4)	2.8	(2.3–3.3)	2.6	(2.2–2.9)	2.7	(2.4–3.1)	0.79	0.0
Iowa	2.8	(2.3–3.3)	2.4	(2.1–2.9)	2.4	(2.1–2.8)	2.2	(1.9–2.6)	2.5	(2.0–3.1)	0.33	-10.7
Kansas	2.5	(2.2–2.8)	2.3	(2.1–2.7)	2.3	(2.0–2.7)	2.4	(2.2–2.7)	2.4	(2.1–2.7)	0.81	-4.0
Kentucky	3.7	(3.1–4.3)	3.4	(3.0–3.9)	3.5	(3.0–4.0)	3.5	(2.9–4.2)	3.3	(2.8–3.8)	0.44	-10.8
Louisiana	3.3	(2.9–3.8)	3.1	(2.6–3.6)	3.7	(3.2–4.3)	3.2	(2.9–3.6)	3.2	(2.8–3.8)	0.94	-3.0
Maine	2.4	(1.9–2.9)	2.5	(2.1–2.9)	2.5	(2.1–2.8)	2.0	(1.8–2.3)	2.4	(2.1–2.8)	0.61	0.0
Maryland	2.7	(2.3–3.1)	2.3	(2.0–2.7)	2.6	(2.3–3.0)	2.2	(1.9–2.6)	2.4	(2.1–2.8)	0.34	-11.1
Massachusetts	1.8	(1.6–2.1)	1.8	(1.6–2.0)	1.8	(1.6–2.0)	1.8	(1.6–2.0)	1.9	(1.7–2.2)	0.79	5.6
Michigan	2.9	(2.5–3.3)	2.7	(2.3–3.1)	2.9	(2.5–3.3)	2.4	(2.2–2.7)	2.7	(2.4–3.1)	0.37	-6.9
Minnesota	1.9	(1.5–2.3)	1.8	(1.5–2.2)	2.2	(1.8–2.6)	2.3	(1.8–2.9)	1.8	(1.5–2.2)	0.48	-5.3
Mississippi	3.8	(3.3–4.3)	3.4	(3.0–3.9)	3.8	(3.4–4.3)	3.6	(3.2–4.0)	3.8	(3.3–4.3)	0.86	0.0
Missouri	3.2	(2.7–3.7)	3.5	(2.9–4.3)	3.3	(2.8–3.8)	2.8	(2.4–3.3)	3.6	(3.0–4.2)	0.92	12.5
Montana	2.6	(2.3–3.1)	2.5	(2.1–2.9)	2.5	(2.1–3.0)	2.1	(1.9–2.5)	2.4	(2.0–3.1)	0.37	-7.7
Nebraska	2.4	(2.1–2.8)	2.4	(2.0–2.8)	2.0	(1.8–2.3)	2.1	(1.8–2.4)	2.1	(1.9–2.4)	0.08	-12.5
Nevada	2.9	(2.3–3.6)	2.4	(1.9–3.1)	2.2	(1.8–2.8)	2.4	(1.9–3.0)	3.1	(2.5–3.9)	0.64	6.9
New Hampshire	2.0	(1.7–2.4)	2.2	(1.8–2.7)	2.3	(1.9–2.8)	2.0	(1.6–2.4)	1.9	(1.6–2.3)	0.48	-5.0
New Jersey	2.1	(1.8–2.3)	2.2	(1.8–2.6)	2.2	(1.9–2.5)	1.9	(1.6–2.2)	2.2	(1.9–2.5)	0.93	4.8
New Mexico	2.5	(2.1–2.9)	2.5	(2.1–3.0)	2.5	(2.1–3.0)	2.2	(1.9–2.5)	2.5	(2.1–2.9)	0.62	0.0
New York	2.1	(1.7–2.5)	2.0	(1.6–2.5)	2.5	(2.1–3.0)	2.3	(1.9–2.8)	2.0	(1.8–2.3)	0.70	-4.8
North Carolina	2.9	(2.7–3.2)	2.9	(2.6–3.2)	3.0	(2.6–3.3)	2.6	(2.3–2.9)	2.9	(2.6–3.3)	0.49	0.0
North Dakota	1.8	(1.5–2.2)	2.0	(1.7–2.4)	2.1	(1.8–2.5)	2.6	(2.2–3.1)	2.1	(1.7–2.5)	0.09	16.7
Ohio	2.8	(2.2–3.7)	2.8	(2.5–3.2)	2.7	(2.4–3.1)	2.8	(2.4–3.3)	2.8	(2.4–3.3)	0.89	0.0
Oklahoma	4.0	(3.5–4.5)	3.2	(2.8–3.6)	3.9	(3.5–4.4)	3.5	(3.2–4.0)	3.9	(3.4–4.4)	0.86	-2.5
Oregon	2.4	(2.0–2.9)	2.1	(1.8–2.5)	2.3	(1.9–2.8)	3.1	(2.4–3.9)	2.2	(1.9–2.6)	0.40	-8.3
Pennsylvania	2.5	(2.1–3.0)	2.9	(2.4–3.6)	2.3	(2.0–2.6)	2.1	(1.8–2.4)	2.9	(2.5–3.2)	0.85	16.0
Rhode Island	1.9	(1.6–2.3)	2.4	(1.9–3.0)	2.1	(1.8–2.6)	2.3	(1.9–2.8)	2.2	(1.8–2.5)	0.55	15.8
South Carolina	2.9	(2.6–3.3)	2.9	(2.6–3.3)	3.0	(2.6–3.4)	2.8	(2.5–3.2)	3.4	(2.9–3.9)	0.22	17.2
South Dakota	2.2	(1.9–2.6)	2.3	(2.0–2.7)	2.4	(2.1–2.7)	2.0	(1.7–2.4)	1.8	(1.6–2.2)	0.04	-18.2
Tennessee	3.1	(2.6–3.8)	3.4	(2.8–4.0)	3.1	(2.7–3.7)	2.7	(2.3–3.3)	3.1	(2.6–3.6)	0.40	0.0
Texas	2.8	(2.3–3.4)	3.0	(2.7–3.3)	2.6	(2.3–3.0)	2.4	(2.0–2.7)	2.9	(2.6–3.3)	0.62	3.6
Utah	2.4	(2.0–2.9)	1.9	(1.6–2.4)	2.4	(2.0–2.8)	2.4	(2.1–2.8)	2.5	(2.2–2.8)	0.29	4.2
Vermont	1.8	(1.5–2.1)	2.1	(1.6–2.9)	2.0	(1.7–2.4)	1.8	(1.5–2.1)	2.0	(1.7–2.3)	0.95	11.1
Virginia	2.0	(1.6–2.4)	2.5	(2.1–3.0)	2.7	(2.3–3.2)	2.2	(1.8–2.6)	2.6	(2.1–3.2)	0.19	30.0
Washington	2.3	(2.1–2.5)	2.3	(2.1–2.5)	2.4	(2.2–2.6)	2.2	(2.0–2.5)	2.3	(2.0–2.5)	0.89	0.0
West Virginia	3.7	(3.2–4.3)	2.8	(2.4–3.3)	3.7	(3.2–4.2)	3.2	(2.7–3.7)	3.0	(2.6–3.6)	0.25	-18.9
Wisconsin	2.3	(1.9–2.9)	1.8	(1.5–2.2)	1.9	(1.6–2.4)	2.0	(1.6–2.5)	1.8	(1.5–2.3)	0.25	-21.7
Wyoming	2.2	(1.8–2.6)	1.9	(1.6–2.3)	2.2	(1.9–2.5)	2.3	(1.9–2.8)	1.8	(1.6–2.2)	0.65	-18.2

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 a stroke?" Refused, "don't know," and missing responses were excluded from analyses.

The findings in this report are subject to the at least four limitations. First, BRFSS does not include persons in institutions, long-term–care facilities, nursing homes, the military, or correctional institutions, and therefore might exclude a substantial proportion of persons with stroke, leading to underestimation of actual stroke prevalence. Second, because the response rate was only 50.6%–54.6%, the generalizability of the findings is questionable to the extent that nonrespondents

FIGURE. Age-adjusted prevalence of stroke* among noninstitutionalized adults aged ≥18 years,† by state — Behavioral Risk Factor Surveillance System, United States, 2010



* 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 a stroke?" Refused, "don't know," and missing responses were excluded from analyses.

differed from respondents. However, sample weights have been applied in all analyses to account for the varying probabilities of nonresponse in the complex survey sampling design, so the impact of noncoverage bias and nonresponse bias on prevalence estimates might be minimal. Third, BRFSS is conducted in English and Spanish only, which could exclude those who cannot speak either of those languages. Finally, BRFSS data are self-reported and therefore are subject to recall bias and social desirability bias.

CDC's State Heart Disease and Stroke Prevention Program currently funds programs in 41 states and DC, as well as the Paul Coverdell National Acute Stroke Registry, to improve the quality of acute stroke care.¶ A major goal of these programs is to build capacity to conduct public health activities to prevent and improve control of the major risk factors for heart disease and stroke, including hypertension and high cholesterolemia. The findings in this report demonstrate the variation in stroke prevalence during 2006–2010, a period in which stroke mortality declined continuously. Especially in states with high stroke prevalence, these findings can help public health officials to develop targeted programs for heart disease and stroke prevention.

¶ Additional information available at http://www.cdc.gov/dhdsp/programs/nhdsp_program/index.htm.

What is already known on this topic?

CDC previously reported that in 2005, 2.6% of U.S. adults had a history of stroke. The prevalence of stroke was higher among older persons, American Indians/Alaska Natives, blacks, and persons with lower levels of education compared with younger persons, whites, and persons with higher levels of education. Also in 2005, a nearly twofold difference was observed between states with the lowest and highest estimated stroke prevalence.

What is added by this report?

This report describes overall and state-specific trends in stroke prevalence in the United States during 2006–2010. The overall prevalence of stroke in the United States during this period declined from 2.7% to 2.6%. Significant linear declines were observed in two states (Georgia and South Dakota), and a linear increase was not observed in any state. Disparities by age, race/ethnicity, education, and state of residence persisted.

What are the implications for public health practice?

Results from this report can help state stroke prevention programs increase state capacity to control and prevent stroke and related risk factors. In addition, especially in states with high stroke prevalence, these findings can help public health officials to develop targeted programs for heart disease and stroke prevention.

References

1. Miniño AM, Murphy SL, Xu J, Kochanek KD. Deaths: final data for 2008. Natl Vital Stat Rep 2011;59(10).
2. Kelly-Hayes M, Beiser A, Kase CS, Scaramucci A, D'Agostino RB, Wolf PA. The influence of gender and age on disability following ischemic stroke: the Framingham Study. J Stroke Cerebrovasc Dis 2003;12:119–26.
3. Roger VL, Go AS, Lloyd-Jones DM, et al. Heart disease and stroke statistics—2012 update: a report from the American Heart Association. Circulation 2012;125:e2–220.
4. Gillum RF, Kwagyan J, Obisesan TO. Ethnic and geographic variation in stroke mortality trends. Stroke 2011;42:3294–6.
5. CDC. Prevalence of stroke—United States, 2005. MMWR 2007; 56:469–74.
6. Klein RJ, Schoenborn CA. Age adjustment using the 2000 projected U.S. population. Healthy People 2010 Stat Notes 2001;20:1–10.
7. Fang J, Alderman MH, Keenan NL, Croft JB. Declining US stroke hospitalization since 1997: National Hospital Discharge Survey, 1988–2004. Neuroepidemiology 2007;29:243–9
8. Carandang R, Seshadri S, Beiser A, et al. Trends in incidence, lifetime risk, severity, and 30–day mortality of stroke over the past 50 years. JAMA 2006;296:2939–46.
9. Kleindorfer DO, Khoury J, Moomaw CJ, et al. Stroke incidence is decreasing in whites but not in blacks: a population-based estimate of temporal trends in stroke incidence from the Greater Cincinnati/Northern Kentucky Stroke Study. Stroke 2010;41:1326–31.
10. Liao Y, Greenlund KJ, Croft JB, Keenan NL, Giles WH. Factors explaining excess stroke prevalence in the US Stroke Belt. Stroke 2009; 40:3336–41.

Announcement

Response to the Advisory Committee on Childhood Lead Poisoning Prevention Report, *Low Level Lead Exposure Harms Children: A Renewed Call for Primary Prevention*

On January 4, 2012, the Advisory Committee on Childhood Lead Poisoning Prevention (ACCLPP), released the report, *Low Level Lead Exposure Harms Children: A Renewed Call for Primary Prevention* (*1*). The committee advised the U.S. Department of Health and Human Services and CDC regarding new scientific knowledge, new technical developments, and their practical implications for childhood lead poisoning prevention efforts.

ACCLPP considered the usefulness of the "level of concern" as a result of accumulating scientific evidence of adverse effects of blood lead levels <10 μg/dL in children. In addition, ACCLPP considered laboratory capability for measuring blood lead levels in establishing new blood lead level guidance, provided advice to CDC on communicating to groups affected by policy changes, and made recommendations for further research on lead-exposure prevention and intervention strategies.

The ACCLPP report included a recommendation to eliminate the use of the term "blood lead level of concern" based on evidence of adverse health effects of levels <10 μg/dL in children. Instead, ACCLPP recommended the adoption of a "reference value" based on the 97.5th percentile of the blood lead level distribution in U.S. children aged 1–5 years, which currently is 5 μg/dL. ACCLPP also recommended that CDC focus priorities on implementing primary prevention strategies and best guidance to respond to children with blood lead levels above the reference value. CDC has reviewed the ACCLPP recommendations and concurs with the recommendations (*2*).

References

1. Advisory Committee on Childhood Lead Poisoning Prevention. Low level lead exposure harms children: a renewed call for primary prevention. Atlanta, GA: US Department of Health and Human Services, CDC, Advisory Committee on Childhood Lead Poisoning Prevention; 2012. Available at http://www.cdc.gov/nceh/lead/acclpp/final_document_010412.pdf. Accessed May 18, 2012.
2. CDC. CDC response to Advisory Committee on Childhood Lead Poisoning Prevention recommendations in "Low level lead exposure harms children: a renewed call for primary prevention." Atlanta, GA: US Department of Health and Human Services, CDC; 2012. Available at http://www.cdc.gov/nceh/lead/acclpp/cdc_response_lead_exposure_recs.pdf. Accessed May 18, 2012.

The *Morbidity and Mortality Weekly Report (MMWR)* Series is prepared by the Centers for Disease Control and Prevention (CDC) and is available free of charge in electronic format. To receive an electronic copy each week, visit *MMWR*'s free subscription page at *http://www.cdc.gov/mmwr/mmwrsubscribe.html*. Paper copy subscriptions are available through the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402; telephone 202-512-1800.

Data presented by the Notifiable Disease Data Team and 122 Cities Mortality Data Team in the weekly *MMWR* are provisional, based on weekly reports to CDC by state health departments. Address all inquiries about the *MMWR* Series, including material to be considered for publication, to Editor, *MMWR* Series, Mailstop E-90, CDC, 1600 Clifton Rd., N.E., Atlanta, GA 30333 or to *mmwrq@cdc.gov.*

All material in the *MMWR* Series is in the public domain and may be used and reprinted without permission; citation as to source, however, is appreciated.

Use of trade names and commercial sources is for identification only and does not imply endorsement by the U.S. Department of Health and Human Services.

References to non-CDC sites on the Internet are provided as a service to *MMWR* readers and do not constitute or imply endorsement of these organizations or their programs by CDC or the U.S. Department of Health and Human Services. CDC is not responsible for the content of these sites. URL addresses listed in *MMWR* were current as of the date of publication.

U.S. Government Printing Office: 2012-523-043/02013 Region IV ISSN: 0149-2195

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention (CDC)
Atlanta, GA 30333

Official Business
Penalty for Private Use $300
Return Service Requested