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Healthy Vision Month — May 2015

May is Healthy Vision Month, a national observance devoted to encouraging persons to make vision and eye health a priority. CDC's Vision Health Initiative partners with the National Eye Institute's National Eye Health Education Program to educate the public about vision loss prevention and eye health promotion.

Early detection, timely treatment, and use of protective eyewear are the best ways to maintain eye health and prevent or delay vision impairment, defined as the best-corrected visual acuity <20/40 in the better-seeing eye (*1*). Nearly 38 million persons in the United States have common eye diseases such as glaucoma, diabetic retinopathy, age-related macular degeneration, and cataracts (*2*).

Regular, comprehensive, dilated eye examination is the only way to detect vision problems and eye diseases in their early stages. The American Academy of Ophthalmology and American Optometric Association recommend regular, comprehensive, dilated eye examination to detect vision problems and eye diseases in their early states for all persons aged ≥65 years and younger persons with diabetes or risk factors for glaucoma (*3,4*). Additional information about vision and eye health is available at http://www.cdc.gov/visionhealth and http://www.nei.nih.gov/healthyeyes.

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Geographic Disparity of Severe Vision Loss — United States, 2009–2013

Karen A. Kirtland, PhD[1]; Jinan B. Saaddine, MD[1]; Linda S. Geiss, MA[1]; Ted J. Thompson, MS[1]; Mary F. Cotch, PhD[2]; Paul P. Lee, MD[3]
(Author affiliations at end of text)

Vision loss and blindness are among the top 10 disabilities in the United States, causing substantial social, economic, and psychological effects, including increased morbidity, increased mortality, and decreased quality of life.* There are disparities in vision loss based on age, sex, race/ethnicity, socioeconomic status, and geographic location (*1*). Current surveillance activities using national and state surveys have characterized vision loss at national and state levels. However, there are limited data and research at local levels, where interventions and policy decisions to reduce the burden of vision loss and eliminate disparities are

* Information available at http://www.cdc.gov/visionhealth/pdf/improving_nations_vision_health.pdf.

INSIDE

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

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often developed and implemented. CDC analyzed data from the American Community Survey (ACS) to estimate county-level prevalence of severe vision loss (SVL) (being blind or having serious difficulty seeing even when wearing glasses) in the United States and to describe its geographic pattern and its association with poverty level. Distinct geographic patterns of SVL prevalence were found in the United States; 77.3% of counties in the top SVL prevalence quartile (≥4.2%) were located in the South. SVL was significantly correlated with poverty (r = 0.5); 437 counties were in the top quartiles for both SVL and poverty, and 83.1% of those counties were located in southern states. A better understanding of the underlying barriers and facilitators of access and use of eye care services at the local level is needed to enable the development of more effective interventions and policies, and to help planners and practitioners serve the growing population with and at risk for vision loss more efficiently.

Data from the 2009–2013 ACS were used to obtain county-level estimates of SVL and poverty level among adults aged ≥18 years and to examine the geographic pattern of SVL and its association with poverty. ACS, conducted by the U.S. Census Bureau, is an ongoing survey sent to approximately 250,000 addresses monthly, providing annual and multiyear estimates of demographic, housing, social and economic characteristics to communities.[†] In the 2009 ACS, the response rate for all states was 98.0%; in 2013, the response rate for all states was 89.9%.[§] In 2008, ACS added questions about disability to better understand the population with disabilities, monitor against discrimination, distribute funds, and develop programs for persons with disabilities. ACS measures SVL based on responses to the question, "Is this person blind or does s/he have serious difficulty seeing even when wearing glasses." In addition, ACS provides county-level data on the percentage of the residents living below the federal poverty level during the preceding 12 months. These estimates are based on reported family income and poverty thresholds published by the U.S. Census Bureau.

The ACS county-level estimates of SVL and poverty level from the combined 2009–2013 surveys were used in this analysis.[¶] The 3,143 counties were divided into quartiles based on SVL prevalence. Counties were divided into quartiles based on the proportion of residents living below the poverty level. Prevalence of SVL and poverty were compared by U.S. Census regions. Pearson's correlation was used to estimate the county-level association between SVL and poverty.

The prevalence of SVL among adults aged ≥18 years ranged from <1% to 18.4%, with a median of 3.1%. More than three quarters (77.3%) of the U.S. counties in the top quartile of SVL prevalence were located in the South, followed by 11.7% in the West, 10.7% in the Midwest, and 0.3% in the Northeast (Figure 1). The proportion of persons living below poverty level

† Information available at http://www.census.gov/acs/www/Downloads/data_documentation/SubjectDefinitions/2013_ACSSubjectDefinitions.pdf.

§ Information available at http://www.census.gov/acs/www/methodology/response_rates_data.

¶ Information available at http://dataferrett.census.gov/TheDataWeb/index.html.

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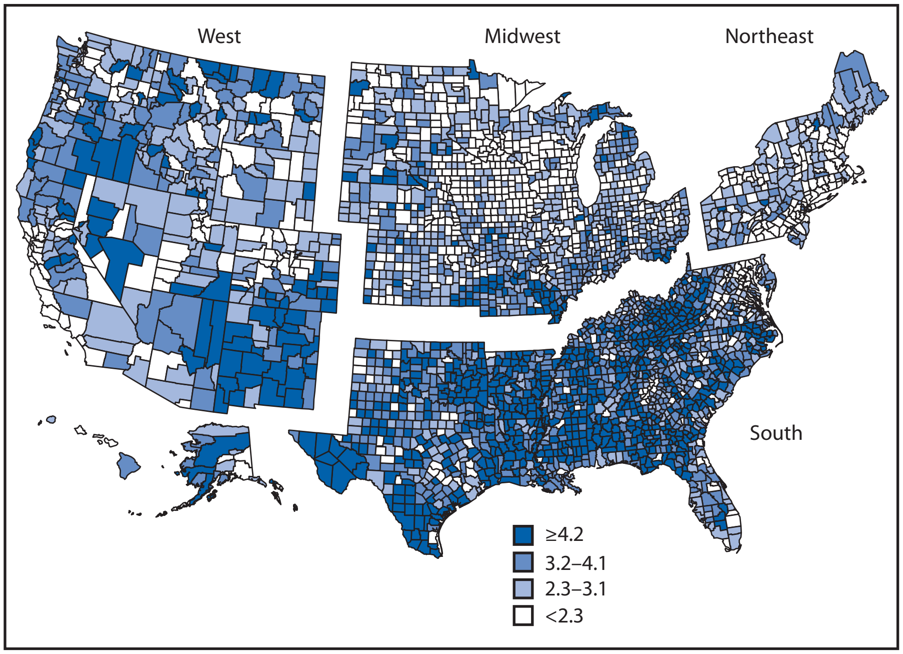
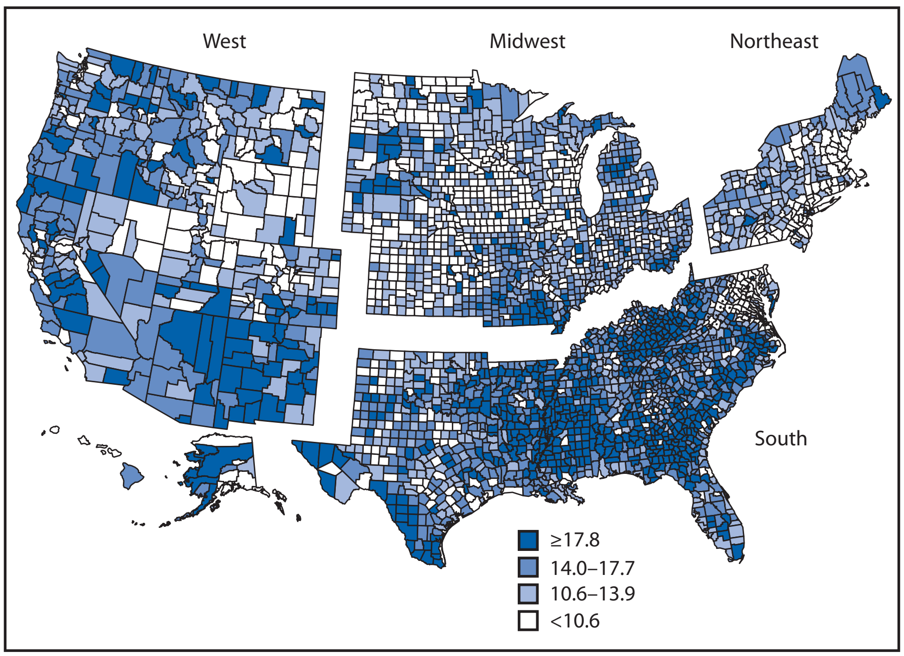
FIGURE 1. Percentages of persons aged ≥18 years with severe vision loss, by county* — United States, American Community Survey, 2009–2013



* Northeast = 217; Midwest = 1,055; South = 1,423; West = 448.

FIGURE 2. Percentages of persons aged ≥18 years with family income below poverty level, by county* — United States, American Community Survey, 2009–2013



* Northeast = 217; Midwest = 1,055; South = 1,423; West = 448.

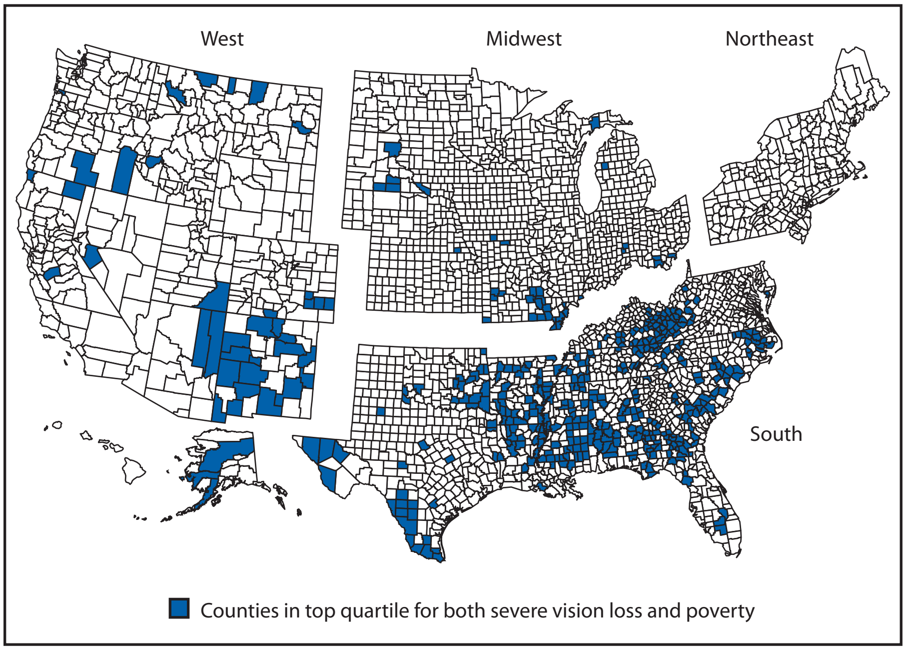
ranged from 1.3% to 48.8% across all counties, with a median of 13.9%. Nearly three quarters (74.5%) of these counties were located in the South, followed by 13.1% in the Midwest, 11.5% in the West, and 0.9% in the Northeast (Figure 2). Among counties in the top quartile for SVL prevalence, 55.5% were also in the top quartile of poverty, and county prevalence of SVL was significantly correlated with county poverty (r = 0.5, p<0.0001). Of the 437 counties in the top quartiles for both SVL and poverty, 83.1% were in the South, followed by 9.1% in the West and 7.8% in the Midwest (Figure 3). No county in the top quartile for both SVL prevalence and poverty were in the Northeast. Eight states had at least 6% of their counties in the top quartile for both SVL and poverty: Alabama, Arkansas, Georgia, Kentucky, Mississippi, North Carolina, Tennessee, and Texas.

Discussion

Vision loss often affects activities of daily living, leads to depression and social isolation, and increases the risk for falls and injuries. An estimated 4 million persons aged ≥40 years in the United States are either blind or have vision loss (defined as best corrected visual acuity <20/40 in the better-seeing eye) and this number is projected to increase to 10 million by 2050.** The most common causes of vision loss among adults in order of prevalence are cataracts, diabetic retinopathy, glaucoma, and age-related macular degeneration, and all these causes of vision loss can develop gradually without warning signs.†† Many others have uncorrected refractive errors that could be easily corrected with glasses or contact lenses (*2*). According to the National Eye Institute, a comprehensive dilated eye examination by an eye-care professional can detect certain eye diseases and conditions in their early stages, before vision loss occurs, and identify uncorrected refractive errors (*3*). In addition to eye examinations, minimizing risks (e.g., by eating right, maintaining a healthy weight, not smoking, understanding one's family eye health history, and using proper eye-safety practices) can prevent or delay vision impairment.§§ In 2013, the total cost of vision problems in the United States was estimated at $145 billion

** Information available at http://forecasting.preventblindness.org.
†† Information available at http://www.cdc.gov/visionhealth/basic_information/eye_disorders.htm.
§§ Information available at http://www.cdc.gov/visionhealth/healthyvisionmonth/index.htm.

FIGURE 3. Counties* in the top quartile for both severe vision loss and family income below poverty level — United States, American Community Survey, 2009–2013



* Northeast = 217; Midwest = 1,055; South = 1,423; West = 448. Numbers indicate total number of counties for each U.S. Census region.

(*2*). Interventions to detect and manage eye conditions that can lead to vision loss are available and cost-effective (*4*). However, access and use of eye care services are often suboptimal (*4*), possibly because this is a preventive service that is frequently not covered by insurance carriers. Medicare, which serves the population at greatest risk for vision loss, persons aged ≥65 years, provides a benefit for comprehensive dilated eye examination only for persons with diabetes or at high risk for glaucoma (*5*).

This report describes the geographic distribution of SVL across all U.S. counties. Using ACS 5-year county estimates, this analysis found 2.6% of adults aged ≥18 years reported SVL. Prevalence varied by county, ranging from <1% to 18.4%, and counties with high SVL were concentrated in southern states. The data show the county level correlation of SVL and poverty, indicating that counties with higher levels of poverty had higher levels of SVL. These findings are consistent with U.S. Census reports of lower earnings and higher poverty rates among persons with disabilities.¶¶

A report on vision loss and work disability from the Institute of Medicine suggests that SVL can result in lower economic earnings (*6*). Previous studies on the link between a person's lower socioeconomic status and visual impairment, eye diseases, and ocular risk factors have found that access to and use of health care are important factors in the relationship between visual impairment and socioeconomic status, and that persons with higher income and education were more likely than those with lower income to visit an eye care provider (*4*,*7*). One report demonstrated the association between low rates of eye care use and lack of health insurance coverage, in addition to limited coverage for ocular care in private insurance plans (*8*). In addition, international studies suggest that neighborhood environment impacts health outcomes through various means, such as unhealthy behaviors in the local environment, availability of health care services, lack of eye health knowledge, and in particular, lack of access to eye care (*9*,*10*).

The findings in this report are subject to at least three limitations. First, data regarding SVL are self-reported and subject to recall bias or social desirability bias, which might cause persons to claim that their vision is better than it is. Second, data are cross-sectional and do not allow conclusions on causality or biologic plausibility. However, these results are consistent with previous studies finding a correlation between poverty and vision loss. Vision loss could be a consequence of poverty (e.g., lack of access to care and lower use of preventive services). Alternatively, persons with SVL often have limited access to education and employment opportunities, which might in turn decrease their earning potential. Finally, the data represent crude estimates of SVL prevalence and the correlation between SVL and poverty, without accounting for other individual and county-level characteristics, such as race/ethnicity, age, and prevalence of related diseases.

The results of this study suggest geographic disparity in SVL, with the South disproportionately bearing a higher prevalence of SVL and poverty. Counties with high prevalence of SVL tended to be those with high poverty levels. Further investigations are needed to better understand the socio-demographic disparities of vision loss, how to minimize risk factors associated with vision loss, and how to improve access and use of eye care services. To reduce risks for vision loss, counties with high rates of SVL can promote healthy eating, maintaining a healthy weight, not smoking, understanding one's family eye health history, using proper eye-safety practices, and routine eye examinations.

¶¶ Information available at http://www.census.gov/prod/2012pubs/p70-131.pdf.

What is already known on this topic?

Vision loss often affects activities of daily living, leads to depression and social isolation, and increases the risk for falls and injuries. The U.S. government, in conjunction with the vision health communities, identified access to eye care services and the reduction of disparities in vision loss and as public health priorities in the *Healthy People 2020* national health objectives. There are limited vision loss data and research at local levels.

What is added by this report?

Distinct geographic patterns of severe vision loss prevalence were found at the county-level in the United States. The findings indicate a significant correlation between severe vision loss and poverty for U.S. counties. The highest prevalence of severe vision loss and poverty were found in the southern states.

What are the implications for public health practice?

To reduce risks for vision loss, counties with high rates of severe vision loss can promote healthy eating, maintaining a healthy weight, not smoking, understanding one's family eye health history, using proper eye-safety practices, and routine eye examinations.

[1]Division of Diabetes Translation, National Center for Chronic Disease Prevention and Health Promotion, CDC; [2]National Eye Institute, National Institutes of Health; [3]Department of Ophthalmology and Visual Sciences, University of Michigan Medical School.

Corresponding author: Karen A. Kirtland, kkirtland@cdc.gov, 770-488-8518.

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Fatal and Nonfatal Drowning Outcomes Related to Dangerous Underwater Breath-Holding Behaviors — New York State, 1988–2011

Christopher Boyd[1]; Amanda Levy, MSPH[1]; Trevor McProud, MS[1]; Lilly Huang, PE[1]; Eli Raneses, MPH[1]; Carolyn Olson, MPH[1]
(Author affiliations at end of text)

Drowning is an important cause of preventable injury and mortality, ranking fifth among leading causes of unintentional injury death in the United States (*1*). In 2011, two healthy young men died in a drowning incident at a New York City (NYC)–regulated swimming facility. The men became unconscious underwater after performing intentional hyperventilation before submersion. The phenomenon of healthy swimmers becoming unconscious underwater has been described elsewhere as hypoxic blackout (*2*). Prompted by this incident, the NYC Department of Health and Mental Hygiene (DOHMH) in collaboration with the New York State Department of Health (SDOH) conducted a case review of New York state fatal and nonfatal drownings reported during 1988–2011 to investigate similar behaviors in other incidents. DOHMH identified 16 cases, three in NYC, with a consistent set of voluntary behaviors associated with unintentional drowning and designated this class of behaviors as "dangerous underwater breath-holding behaviors" (DUBBs). For this small sample, the frequency of different DUBBs varied by age and swimming level, and practicing more than one DUBB increased the risk for fatality. This research contributes to the literature on drowning by focusing on contributing behaviors rather than drowning outcomes. NYC recently enacted public health education and regulations that discourage DUBBs; these interventions have the potential to effectively reduce unintentional drowning related to these behaviors and could be considered by other municipalities and jurisdictions.

Drownings associated with DUBBs can occur at any water depth and be caused by many disparate factors. A precise definition describes the condition as "breath-hold blackout," referring to the behavior rather than the outcome (i.e., hypoxic blackout) (*3*,*4*). The physiologic mechanism by which breath-hold blackout drownings occur is well-understood (*5*). Hyperventilation or breath-holding before diving or swimming decreases the body's stores of CO_2 and partial pressure of carbon dioxide (P_{CO2}), delaying the cerebral response to come to the surface to breathe. The "blackout" is caused by the drop in partial pressure of oxygen (P_{O2}) in arterial blood gas, resulting in hypoxia and loss of consciousness underwater. However, the behavioral antecedents of these drownings often go unreported. Only two case series studies from the 1960s and 1970s examined common features in drowning incidents in which hyperventilation resulted in the loss of consciousness underwater (*5*,*6*).

To identify incidents for this case series, the following list of three DUBBs was generated through a review of the available literature, expert opinion, and behaviors documented in identified cases (*6*,*7*): 1) intentional hyperventilation before or during submergence/swimming; 2) static apnea (i.e., when a swimmer submerges and attempts breath-holding for as long as possible, including "breath-holding games" with a partner, often while staying motionless); and 3) hypoxic training (i.e., prolonged underwater distance swimming or extended breath-hold intervals, which might be supervised or unsupervised).

Case information was developed by DOHMH from a review of incidents occurring at regulated swimming facilities (i.e., bathing establishments used for reasons other than personal or medical) using an SDOH database and available documentation from incident reports, lifeguard reports, police reports, inspection reports, emergency medical services reports, and hospital and medical examiner reports. Search terms used to identify fatal and nonfatal unintentional drowning cases based on the swimmer's behavior included "repeated breath-holding," "breath-holding games/competition," "prolonged/extended submersion," "underwater distance swimming," and "hyperventilation." DOHMH developed a case definition for DUBB-related incidents as those in which 1) fatal or nonfatal drowning followed one or more of the three DUBBs, and 2) the swimmer was otherwise not impaired and had no known preexisting health condition.

Six of 22 identified cases were excluded because of existing medical conditions or substance use, resulting in a case series of 16 DUBB-related drownings. Swimming ability was characterized as beginner, good, advanced, or unknown based on SDOH drowning investigation guidelines.

Behavior Types

The following cases illustrate each DUBB as a contributing cause of unintentional drowning injury.

Intentional hyperventilation. Two advanced-level, adult, male swimmers in good health were performing strenuous exercises to prepare for an advanced military fitness test. After alternating between push-ups and swimming laps, the swimmers began intentional hyperventilation and submersion breath-control exercises. Minutes later, both swimmers were found submerged underwater and not moving. Cardiopulmonary resuscitation was administered by lifeguards until emergency medical services personnel arrived. Both men were pronounced dead at the hospital.

Static apnea. A teenage, male swimmer in good health with unknown swimming experience was participating in breath-holding contests and horseplay with friends. The swimmer fell unconscious underwater and his friends alerted lifeguards. Lifeguards were able to resuscitate him.

Hypoxic training. An advanced-level, teenage, male swimmer with no preexisting health conditions and experience working as a lifeguard was training for his goal to join the U.S. Navy Seals. He was observed by pool staff performing breath-holding exercises and underwater lap swimming. He repeatedly submerged himself for extended periods of time, until it was noticed that he was unconscious. Efforts were made by the lifeguards and emergency medical services personnel to resuscitate him. He was pronounced dead at the hospital.

Summary of 16 cases

The 16 DUBB cases in New York State during 1988–2011 involved 16 persons, 15 incidents (one of which included two persons), and four fatalities. Swimmers were aged 7–47 years, with an average age of 17 years (Table). Similar to most recorded drowning cases nationwide, the majority of the persons involved were male (n = 13). The most commonly reported DUBB behavior was static apnea (n = six). Four cases were associated with hypoxic training, three cases with intentional hyperventilation, and two fatal cases had a combination of both intentional hyperventilation and hypoxic training behaviors. In all four fatalities, the decedents were aged 17–22 years, known to be advanced to expert swimmers, and engaged in intentional hyperventilation. As illustrated in the static apnea incident described previously, half of decedents engaged in a DUBB coactivity (multiple behaviors) with intentional hyperventilation and underwater lap swimming.

DUBBs differed by both swimming experience and age group. Swimming experience was known for 14 cases. All intentional hyperventilation cases and half of all DUBB incidents involved advanced-level swimmers. Among swimmers with known experience (all aged 7–24 years), more experienced swimmers (n = eight) engaged in hypoxic training, intentional hyperventilation or both, whereas less experienced swimmers engaged primarily in static apnea.

Of the 16 drownings, 15 occurred at a pool facility: seven outdoors, seven indoors, and one in a wave pool. The remaining incident occurred in a nonregulated stream. More than half of all DUBB incidents occurred when more than one swimmer was in the pool with the affected swimmer at the time of the incident.

What is already known on this topic?

Drowning is a major source of injury in the United States. The physiologic causes of drownings related to breath-holding among otherwise healthy swimmers have been the focus of aquatic program–based materials on drowning prevention and academic literature, but little research has examined the epidemiology of contributing behaviors in such incidents.

What is added by this report?

This report identifies a class of swimming behaviors, designated dangerous underwater breath-holding behaviors (DUBBs), that can lead to potentially fatal drowning outcomes and could be easily prevented to decrease the risk for drowning among otherwise healthy swimmers. They include intentional hyperventilation, static apnea, and hypoxic training. The frequency of different DUBBs varied by age and swimming level of the swimmers involved, and for this small sample, practicing more than one DUBB type increased the likelihood of a drowning injury.

What are the implications for public health practice?

Drowning continues to present a public health risk, even in facilities that have adequate lifeguards and other safety precautions. Through educational initiatives and policy-level changes to the New York City Health Code, the New York City Department of Health and Mental Hygiene has taken steps to increase awareness of dangerous swimming behaviors to prevent unintentional drownings.

All but one of the incidents at the 15 regulated facilities occurred with a lifeguard on duty and involved a lifeguard rescue attempt. The exception was an incident during which a member of an advanced high school swimming program was practicing hypoxic behavior at his school's private facility before hours of operation.

Discussion

This case series highlights a group of voluntary, dangerous behaviors that contributed to a number of unintentional drownings in New York State. The findings contribute to drowning prevention research by shifting focus from final outcomes to modifiable behavioral risk factors. DUBBs can lead to drowning in otherwise healthy persons, so incidence of this type of drowning can be prevented with interventions such as improved supervision, regulation, and public education (*8*). Since 2014, the NYC Health Code requires the posting of prevention-focused signage at permitted bathing establishments, with warnings that intentional hyperventilation and competitive, repetitive, or prolonged underwater swimming or breath-holding can be dangerous. The code also requires that facilities post a pictorial warning sign aimed at younger swimmers, and it expands pool operator responsibilities to include discouraging such DUBBs and updating their site

TABLE. Summary of dangerous underwater breath-holding behaviors (DUBBs) resulting in fatal or nonfatal drowning, by selected characteristics — New York State, 1988–2011

			DUBB type							
	Total		Intentional hyperventilation		Static apnea		Hypoxic training		Intentional hyperventilation and hypoxic training coactivity	
Characteristic	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Overall	**16**	**(100)**	3	(19)	6	(38)	5	(31)	2	(13)
Sex										
Male	**13**	**(81)**	3	(100)	4	(67)	3	(60)	2	(100)
Female	**3**	**(19)**	0	—	2	(33)	1	(20)	0	—
Age group (yrs)										
<15	**7**	**(44)**	0	—	4	(67)	3	(60)	0	—
15–24	**8**	**(50)**	2	(67)	2	(33)	1	(20)	2	(100)
≥25	**1**	**(6)**	1	(33)	0	—	0	—	0	—
Drowning type										
Nonfatal drowning	**12**	**(75)**	1	(33)	6	(100)	5	(100)	0	—
Fatal drowning	**4**	**(25)**	2	(67)	0	—	0	—	2	(100)
Swimming ability										
Beginner	**5**	**(31)**	0	—	5	(83)	0	—	0	—
Good	**1**	**(6)**	0	—	0	—	1	(20)	0	—
Advanced	**8**	**(50)**	3	(100)	0	—	3	(60)	2	(100)
Unknown	**2**	**(13)**	0	—	1	(17)	1	(20)	0	—
Facility type										
Public	**7**	**(47)**	3	(100)	0	—	2	(40)	2	(100)
Private	**9**	**(53)**	0	—	6	(100)	3	(60)	0	—
Bathing facility type										
Indoor pool	**7**	**(44)**	1	(33)	2	(33)	3	(60)	1	(50)
Outdoor pool	**7**	**(44)**	2	(67)	2	(33)	2	(40)	1	(50)
Wave pool	**1**	**(6)**	0	—	1	(17)	0	—	0	—
Nonregulated stream	**1**	**(6)**	0	—	1	(17)	0	—	0	—
No. of other bathers at time of incident										
None	**1**	**(6)**	1	(33)	0	—	0	—	0	—
1–5	**2**	**(13)**	0	—	1	(17)	0	—	1	(50)
6–10	**0**	**—**	0	—	0	—	0	—	0	—
11–20	**6**	**(38)**	2	(67)	2	(33)	1	(20)	1	(50)
>20	**1**	**(6)**	0	—	0	—	1	(20)	0	—
Unknown	**6**	**(38)**	0	—	3	(50)	3	(60)	0	—
No. of lifeguards on duty at time of incident										
None	**1**	**(6)**	0	—	0	—	1	(20)	0	—
1–2	**8**	**(50)**	0	—	2	(33)	2	(40)	1	(50)
3–5	**2**	**(13)**	0	—	1	(17)	0	—	1	(50)
>5	**0**	**—**	0	—	0	—	0	—	0	—
Unknown	**5**	**(31)**	3	(100)	3	(50)	2	(40)	0	—

safety plans to prohibit DUBBs unless explicitly permitted under enhanced supervision. Future intervention activities will include educational efforts to inform parents, coaches, safety officials, and swimmers about the risks for DUBBs.

The findings in this report are subject to at least two limitations. First, because this study used incident reports as surveillance data, changes in definitions and coding conventions during the 20-year timeframe might have led to some missed cases. Second, cases might have been missed because behaviors leading to drownings are frequently underreported. Fifteen of the 16 incidents in this case study occurred at bathing facilities that require an operating permit from DOHMH, and all had witnesses who reported predrowning behaviors. However, research suggests that more than half of drowning incidents are not witnessed (*9,10*). A previous case study found that swimmers who engage in the most dangerous DUBB (intentional hyperventilation) might do so regularly (*9*), suggesting the possibility of unobserved incidents.

[1]Division of Environmental Health, New York City Department of Health and Mental Hygiene.

Corresponding author: Amanda Levy, alevy3@health.nyc.gov, 347-396-6139.

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Tetanus, Diphtheria, Pertussis Vaccination Coverage Before, During, and After Pregnancy — 16 States and New York City, 2011

Indu B. Ahluwalia, PhD[1]; Helen Ding, MD[2]; Denise D'Angelo, MPH[1]; Kristen H. Shealy, MSPH[2]; James A. Singleton, PhD[3]; Jennifer Liang, DVM[4]; Kenneth D. Rosenberg, MD[5] (Author affiliations at end of text)

In June 2011, the Advisory Committee on Immunizations Practices (ACIP) recommended 1 dose of a tetanus, diphtheria, and acellular pertussis (Tdap) vaccine during pregnancy for women who had not received Tdap previously (*1*). Before 2011, Tdap was recommended for unvaccinated women either before pregnancy or postpartum (*2*). In October 2012, ACIP expanded the 2011 recommendation, advising pregnant women to be vaccinated with Tdap during each pregnancy to provide maternal antibodies for each infant (*3*). The optimal time for vaccination is at 27–36 weeks' gestation as recommended by ACIP. In response to ACIP's Tdap recommendation for pregnant women in 2011, CDC added a supplemental question to the Pregnancy Risk Assessment Monitoring System (PRAMS) survey to determine women's Tdap vaccination status before, during, or after their most recent delivery. This report describes overall and state-specific Tdap vaccination coverage around the time of pregnancy using data from 6,852 sampled women who delivered a live-born infant during September–December 2011 in one of 16 states or New York City (NYC). Among the 17 jurisdictions, the median percentage of women with live births who reported any Tdap vaccination was 55.7%, ranging from 38.2% in NYC to 76.6% in Nebraska. The median percentage who received Tdap before pregnancy was 13.9% (range = 7.7%–20.1%), during pregnancy was 9.8% (range = 3.8%–14.2%), and after delivery was 30.9% (range = 13.6%–46.5%). The PRAMS data indicate a wide variation in Tdap vaccination coverage among demographic groups, with generally higher postpartum coverage for non-Hispanic white women, those who started prenatal care in the first trimester, and those who had private health insurance coverage. This information can be used for promoting evidence-based strategies to communicate the importance of ACIP guidelines related to Tdap vaccination coverage to women and their prenatal care providers.*

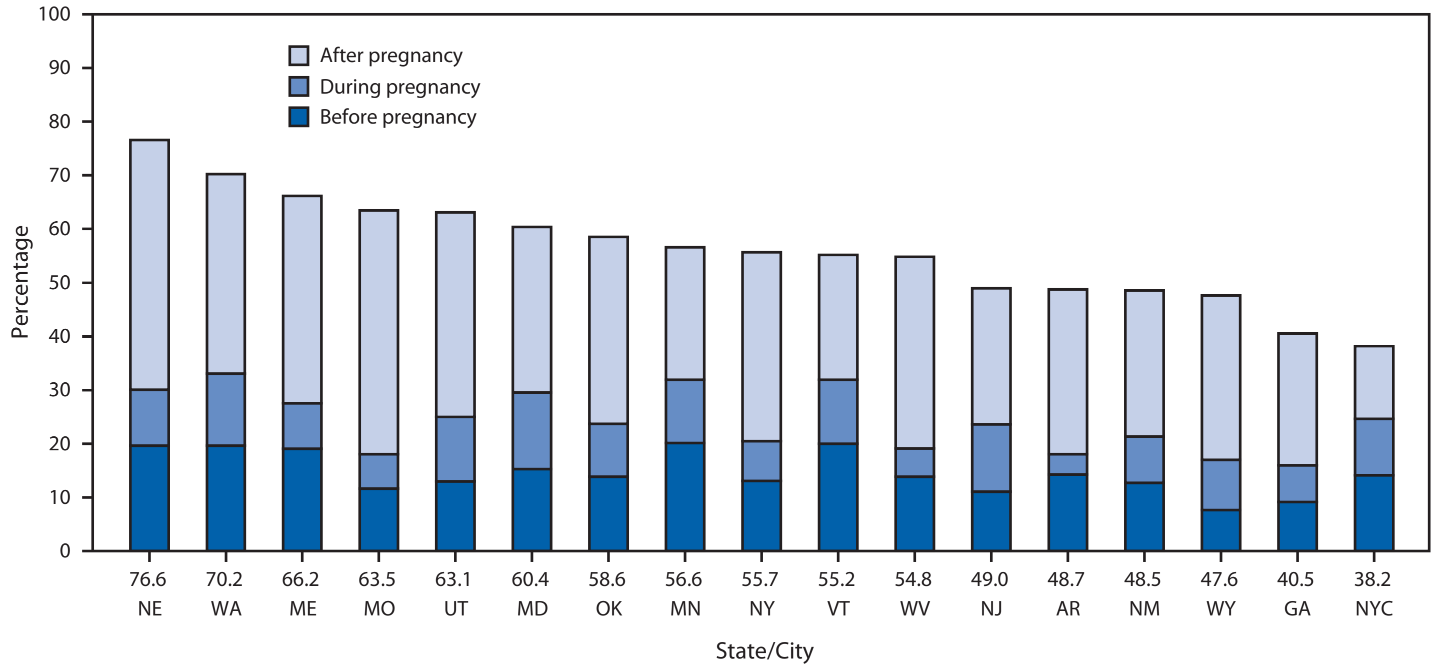
CDC analyzed data from PRAMS, an ongoing, population-based survey that collects data on maternal behaviors around the time of pregnancy from women who delivered a live-born infant. Approximately 2 months after delivery, the PRAMS program in each state takes stratified random samples of 100–300 women from each site's birth registry. The selected mothers were mailed up to three questionnaires, and those who did not respond by mail were contacted by telephone. For mothers who delivered a live-born infant during September–December 2011 and were surveyed during December 2011–May 2012, a questionnaire supplement with a question about Tdap vaccination status was included. PRAMS data collected by 16 states and New York City were analyzed. All states included in the analysis met the PRAMS response threshold of 65% (median = 69.5%; range = 65.0%–81.0%); states with less than 65% response were not included in the analysis. Weighted PRAMS data for 2011 were aggregated, and Tdap vaccination coverage was estimated for each of the 16 states and NYC. In addition, for the aggregate of states, both overall Tdap vaccination coverage and overall coverage before, during, and after pregnancy were reported. Tdap vaccination coverage was examined by selected characteristics for aggregated data. Data from respondents who reported not knowing whether or not they had received Tdap vaccination were excluded from estimates of Tdap vaccination coverage. All estimates were weighted to account for the complex survey design and nonresponse.

As an additional analysis, information collected by Oregon PRAMS during 2009–2011 on whether women's providers offered them a Tdap vaccination postpartum was examined by CDC. The Oregon PRAMS survey did not ask about Tdap vaccination status during 2011.

Overall, of the 6,852 women who delivered a live-born infant and responded to the Tdap question in PRAMS, 20.8% (1,353) did not know their vaccination status. Among the 5,499 with known vaccination coverage status overall, 53.4% reported being vaccinated with Tdap, including 13.9% before pregnancy, 9.9% during pregnancy, and 30.5% after delivery. There was wide variation in Tdap vaccination coverage by jurisdiction among respondents with a median of 55.7% (range = 38.2%–76.6%) (Figure) (Table 1). PRAMS data also indicated higher postpartum Tdap vaccination prevalence among non-Hispanic white women, those with private insurance, and those who initiated prenatal care in the first trimester (Table 2). In Oregon, the percentage of women who reported that their provider offered Tdap vaccination postpartum increased from 30.3% (95% confidence interval

*Additional information available at http://www.thecommunityguide.org/vaccines/index.html.

FIGURE. Percentage of women reporting receiving Tdap before, during, and after pregnancy among those delivering a live-born infant during September–December 2011, by state/city — Pregnancy Risk Assessment Monitoring System, 16 states and New York City, 2011



Abbreviation: Tdap = tetanus, diphtheria, and acellular pertussis vaccine.
State/city abbreviations: AR = Arkansas; GA = Georgia; MD = Maryland; ME = Maine; MN = Minnesota; MO = Missouri; NE = Nebraska; NJ = New Jersey; NM = New Mexico; NY = New York; NYC = New York City; OK = Oklahoma; UT = Utah; VT = Vermont; WA = Washington; WV = West Virginia; WY = Wyoming.

[CI] = 26.9%–33.9%) in 2009 to 47.1% (CI = 43.7%–50.5%) in 2010 to 55.8% (CI = 52.3%–59.2%) in 2011 ($p<0.05$).

Discussion

Before the June 2011 change in the Tdap recommendation for pregnant women, postpartum vaccination was recommended by ACIP and the American College of Obstetricians and Gynecologists. Results from this analysis might reflect the early transition from a policy of vaccinating women postpartum to a policy of vaccinating them during pregnancy (*1*). Among PRAMS participants, over half reported having been vaccinated at some time before, during, or after pregnancy and of these, most reported being vaccinated after delivery. Overall coverage varied both among states and by demographic groups as seen previously among U.S. adults (*4*). Two studies using different data sets, one using Vaccine Safety Datalink information from large, private, medical care organizations and another using Medicaid claims data, show results similar to PRAMS in that those reporting early entry into prenatal care and non-Hispanic whites were more likely to report being vaccinated (*5*,*6*). The differences in timing of coverage reported in these studies and PRAMS might be the result of methodologic differences in data sources and ascertainment.

PRAMS data on Tdap, similar to influenza vaccination coverage, indicate that Tdap vaccination coverage was lower for non-Hispanic black women, those with Medicaid health care coverage for prenatal care, and those starting prenatal care after the first trimester of pregnancy. To improve coverage, coordinated, cross-sector efforts are needed, similar to those that occurred during the 2009 influenza A (H1N1) pandemic. These included vaccination promotion to providers and patients, removal of reimbursement barriers, coordination, and communication during the pandemic (*7*–*9*). Previous research on seasonal influenza vaccination shows that health care provider recommendations are strongly associated with a higher coverage among pregnant women; similar vaccination recommendations by providers might be needed to reach greater Tdap coverage (*10*). In addition, variation in coverage might have occurred as a result of state-specific programs and policies on adult immunizations.

The findings in this report are subject to at least five limitations. First, PRAMS data are self-reported several months after delivery and are subject to recall bias. Second, the response rates varied among the states from 65% to 81% and might be subject to nonresponse bias even after weighting adjustment. Third, 20.8% of respondents did not know their Tdap vaccination status, and overall aggregate estimates of Tdap vaccination could have ranged from 43.1% to 63.9% depending on whether none or all of those reporting unknown Tdap vaccination status were vaccinated. Fourth, reported Tdap vaccinations after pregnancy

TABLE 1. Percentage of women reporting Tdap vaccination before, during, and after pregnancy among those who had a live birth during September–December 2011, by state/city — Pregnancy Risk Assessment Monitoring System, 16 states and New York City, 2011

State/City	No. in sample*	Vaccinated with Tdap: Overall Weighted %	Overall (95% CI)	Before pregnancy Weighted %	Before pregnancy (95% CI)	During pregnancy Weighted %	During pregnancy (95% CI)	After pregnancy Weighted %	After pregnancy (95% CI)
Overall	**5,499**	**53.3**	**(51.3–55.4)**	**13.9**	**(12.6–15.3)**	**9.7**	**(8.5–10.9)**	**29.8**	**(28.0–31.7)**
Arkansas	241	48.7	(38.4–59.2)	14.3	(8.2–23.8)	3.8	(1.5–9.4)	30.7	(21.9–41.0)
Georgia	329	40.5	(31.9–49.8)	9.2	(5.1–15.8)	6.8	(3.5–12.9)	24.6	(17.5–33.3)
Maryland	378	60.4	(52.6–67.7)	15.3	(10.4–21.9)	14.2	(9.4–21.0)	30.9	(24.2–38.6)
Maine	278	66.2	(59.3–72.4)	19.1	(14.4–24.9)	8.5	(5.1–13.9)	38.6	(32.2–45.4)
Minnesota	363	56.6	(50.9–62.2)	20.1	(16.1–24.9)	11.8	(8.6–16.1)	24.7	(20.2–29.9)
Missouri	299	63.5	(57.1–69.4)	11.6	(8.1–16.4)	6.4	(3.9–10.5)	45.4	(39.2–51.8)
Nebraska	447	76.6	(71.7–80.8)	19.7	(15.6–24.5)	10.4	(7.6–14.0)	46.5	(41.1–52.1)
New Jersey	383	49.0	(43.5–54.5)	11.1	(8.0–15.2)	12.6	(9.4–16.7)	25.4	(20.9–30.4)
New Mexico	379	48.5	(43.6–53.5)	12.7	(9.8–16.5)	8.7	(6.2–12.0)	27.2	(23.0–31.8)
New York	260	55.7	(48.0–63.2)	13.1	(8.7–19.1)	7.4	(4.2–12.7)	35.2	(28.3–42.8)
Oklahoma	390	58.6	(49.9–66.7)	13.9	(8.8–21.3)	9.8	(5.5–17.0)	34.8	(27.3–43.2)
Utah	334	63.1	(57.1–68.7)	13	(9.5–17.5)	12	(8.5–16.6)	38.1	(32.4–44.2)
Vermont	253	55.2	(48.9–61.3)	20	(15.5–25.4)	12	(8.4–16.7)	23.3	(18.5–28.9)
Washington	292	70.2	(63.5–76.2)	19.6	(14.7–25.7)	13.4	(9.5–18.7)	37.2	(30.6–44.2)
West Virginia	420	54.8	(49.0–60.5)	13.8	(10.2–18.4)	5.3	(3.3–8.5)	35.7	(30.2–41.5)
Wyoming	145	47.6	(38.4–57.0)	7.7	(4.0–14.1)	9.3	(5.1–16.5)	30.7	(22.8–39.9)
NYC	308	38.2	(31.6–45.4)	14.2	(9.9–19.9)	10.4	(6.8–15.7)	13.6	(9.4–19.3)
Median	**329**	**55.7**		**13.9**		**9.8**		**30.9**	
Maximum	**447**	**76.6**		**20.1**		**14.2**		**46.5**	
Minimum	**145**	**38.2**		**7.7**		**3.8**		**13.6**	

Abbreviations: CI = confidence interval; Tdap = tetanus, diphtheria, and acellular pertussis.
* Excluded those who reported "don't know" or "missing" for their vaccination status (n = 1,353).

could have occurred any time during the period immediately after delivery until the date the survey was completed, and do not necessarily indicate immediate postpartum vaccination given at the birthing facility. The optimal time for vaccination is at 27–36 weeks' gestation as recommended by ACIP. Finally, data were available for a 4-month period and thus do not represent the entire year of data collection among women with live-born infants; the results are not generalizable to all women delivering a live-born infant in the states included in this analysis.

With almost one fifth of women not knowing their Tdap vaccination status, there is a widespread need for providers to ensure they are communicating information about recommended vaccinations and to educate all women about the importance of keeping their vaccination status up-to-date and documented, especially reproductive-age women (*5*). Health care providers can assist pregnant women by providing specific information about where to obtain Tdap vaccination, or offering to provide the vaccination, and also to write a prescription in case it is needed; additional tools for providers are available.† Knowledge of Tdap vaccination among women and health care providers might be lagging because the changes to the

† Additional information available at http://www.cdc.gov/pertussis/pregnant/HCP.

What is already known on this topic?

Infants have substantially higher rates of pertussis and the largest burden of pertussis-related deaths. Maternal vaccination with tetanus, diphtheria, and acellular pertussis (Tdap) vaccine protects infants from pertussis. The Advisory Committee on Immunization Practices (ACIP) recommended in 2012 that pregnant women be vaccinated with Tdap during each pregnancy regardless of previous immunization status. Women who are not vaccinated during pregnancy should be vaccinated with Tdap during the postpartum period.

What is added by this report?

Among 16 states and New York City participating in the Pregnancy Risk Assessment Monitoring System supplemental data collection, the median proportion of women with recent live-births during September–December 2011 who reported receiving Tdap vaccination before pregnancy was 13.9%, during pregnancy was 9.8%, and after delivery was 30.9%. These results can provide a baseline for evaluating implementation of the current recommendations for Tdap vaccination for pregnant women.

What are the implications for public health practice?

Efforts to promote and educate pregnant women and their providers on the importance of Tdap vaccination during pregnancy are needed to increase coverage of Tdap among pregnant women to protect mothers and their infants from pertussis.

TABLE 2. Percentage of women reporting Tdap vaccination before, during, and after pregnancy among those who had a live birth during September–December 2011, by selected characteristics — Pregnancy Risk Assessment Monitoring System, 16 states and New York City, 2011

Characteristic	No. in sample*	Vaccinated with Tdap					
		Before pregnancy		During pregnancy		After pregnancy	
		Weighted %	(95% CI)	Weighted %	(95% CI)	Weighted %	(95% CI)
Age group (yrs)							
<20†	452	13.5	(9.0–19.7)	16.2	(11.1–22.8)	26.7	(20.4–34.1)
20–24	1,221	11.3	(8.7–14.7)	11.9	(9.2–15.3)	28.0	(24.0–32.5)
25–29	1,512	14.4	(12.0–17.3)	9.2	(7.1–11.8)	33.3	(30.0–37.2)
30–34	1,363	15.9	(13.2–19.0)	8.3§	(6.4–10.7)	33.2	(29.5–37.2)
≥35	949	13.6	(10.5–17.5)	9.0§	(6.4–12.3)	26.2	(22.3–30.6)
Race/Ethnicity							
Hispanic	767	12.6	(9.6–16.5)	17.1§	(13.6–21.2)	21.2§	(18.3–26.6)
White, non-Hispanic†	3,281	15.0	(13.2–17.0)	7.5	(6.2–9.1)	34.9	(32.4–37.6)
Black, non-Hispanic	748	10.7	(7.4–15.2)	12.8	(9.0–18.0)	21.7§	(16.7–27.6)
Other	690	14.2	(10.8–18.3)	9.8	(7.0–13.4)	28.0	(23.1–33.6)
Marital status							
Married†	3,338	15.8	(14.0–17.8)	7.4	(6.1–8.8)	32.6	(30.2–35.1)
Other	2,151	10.8§	(8.8–13.1)	14.2§	(11.9–16.9)	27.1§	(24.1–30.4)
Education							
<High school†	782	12.1	(8.8–16.4)	14.7	(11.1–19.3)	21.2	(16.9–26.3)
High school	1,331	8.5	(6.4–11.1)	13.2	(10.4–16.6)	30.8§	(26.6–35.5)
>High school	3,338	16.4	(14.6–18.4)	7.6§	(6.4–9.0)	32.9§	(30.5–35.3)
Parity							
One†	2,365	14.0	(12.0–16.2)	11.0	(9.1–13.1)	33.4	(30.5–36.6)
Two or more	3,092	14.0	(12.2–16.1)	9.0	(7.6–10.8)	28.5	(26.0–31.0)
WIC-during pregnancy							
No†	2,890	16.4	(14.5–18.5)	7.5	(6.2–9.1)	33.5	(31.0–36.2)
Yes	2,568	11.2§	(9.3–13.4)	13.0§	(10.9–15.3)	26.8§	(24.0–29.9)
Health Insurance status at delivery							
Private†	2,352	17.7	(15.5–20.2)	7.2	(5.8–8.9)	35.2	(32.4–38.1)
Medicaid	2,360	10.7§	(8.8–12.9)	12.5§	(10.5–14.9)	26.4§	(23.5–29.6)
Both	277	11.8	(6.1–21.7)	10.5	(5.9–18.0)	33.4	(23.6–44.7)
Other	375	12.3	(8.3–17.8)	13.2	(8.6–19.6)	28.0	(21.5–35.6)
Prenatal care							
First trimester†	4,509	14.5	(12.9–16.2)	9.8	(8.5–11.2)	32.2	(30.0–34.4)
Second trimester or later	825	11.6	(8.6–15.3)	10.9	(7.9–14.9)	23.5§	(19.1–28.5)

Abbreviations: CI = confidence interval; Tdap = tetanus, diphtheria, and acellular pertussis; WIC = Women, Infants, and Children Special Supplemental Nutrition Program.
* Excluded those who reported "don't know" or "missing" for their vaccination status.
† Referent group.
§ $p<0.05$ compared with referent group.

Tdap recommendation were relatively recent (*1*,*3*). Promoting communication strategies that increase awareness of Tdap recommendations to providers, pregnant women, adults, and anyone who might come into contact with infants aged <12 months is important.

Estimates from Oregon indicate that the proportion of providers who offered Tdap vaccination postpartum increased from 2009 to 2011, likely reflecting adoption of 2005 recommendations for pregnant women (*2*). Shortly after being recommended during pregnancy in June 2011, Tdap vaccination coverage during pregnancy was low; however, those results might reflect only the first few months of full implementation of the recommendation, which was published by CDC in October 2011. In contrast, this report assessed coverage among women delivering a live-born infant during September–December 2011. Thus, results in this report might provide a baseline for evaluating implementation of the current Tdap recommendations for pregnant women.

[1]Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion, CDC; [2]DB Consulting Group, Inc.; [3]Immunization Services Division, National Center for Immunization and Respiratory Diseases, CDC; [4]Division of Bacterial Diseases, National Center for Immunization and Respiratory Diseases, CDC. [5]PRAMS Oregon, Maternal & Child Health Epidemiologist, Oregon Public Health Division.

Corresponding author: Indu B. Ahluwalia, iahluwalia@cdc.gov, 770-488-5764.

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Progress Toward Polio Eradication — Worldwide, 2014–2015

José E. Hagan, MD[1,2]; Steven G.F. Wassilak, MD[2]; Allen S. Craig, MD[2]; Rudolf H. Tangermann, MD[3]; Ousmane M. Diop, PhD[3]; Cara C. Burns, PhD[4]; Arshad Quddus, MD[3] (Author affiliations at end of text)

In 1988, the World Health Assembly of the World Health Organization (WHO) resolved to eradicate polio worldwide (*1*). Wild poliovirus (WPV) transmission has been interrupted in all but three countries (Afghanistan, Nigeria, and Pakistan). No WPV type 2 cases have been detected worldwide since 1999, and the last WPV type 3 case was detected in Nigeria in November 2012; since 2012, only WPV type 1 has been detected (*2*). Circulating vaccine-derived poliovirus (cVDPV), usually type 2, continues to cause cases of paralytic polio in communities with low population immunity (*3*). In 2012, the World Health Assembly declared global polio eradication "a programmatic emergency for global public health" (*1*), and in 2014, WHO declared the international spread of WPV to previously polio-free countries to be "a public health emergency of international concern" (*4*). This report summarizes global progress toward polio eradication during 2014–2015 and updates previous reports (*5*). In 2014, a total of 359 WPV cases were reported in nine countries worldwide (*6*). Although reported WPV cases increased in Pakistan and Afghanistan, cases in Nigeria decreased substantially in 2014, and encouraging progress toward global WPV transmission interruption has occurred. Overcoming ongoing challenges to interruption of WPV transmission globally will require sustained programmatic enhancements, including improving the quality of supplementary immunization activities (SIAs) to interrupt transmission in Afghanistan and Pakistan and to prevent WPV exportation to polio-free countries.

Routine Poliovirus Vaccination Coverage

Estimated coverage in 2013 (the latest year for which complete data are available) among infants aged <1 year with 3 doses of oral poliovirus vaccine (OPV3) delivered through routine immunization programs was 90% in Afghanistan, 67% in Nigeria, and 66% in Pakistan, with substantial subnational variation. OPV3 coverage was 97% in the WHO Western Pacific Region, 96% in the European Region, 90% in the Region of the Americas, 82% in the Eastern Mediterranean Region, 77% in the African Region, and 76% in the South-East Asia Region (*7*).

Supplementary Immunization Activities (SIAs)

In 2014, approximately 2.3 billion OPV doses were administered in 341 SIAs in 45 countries (Table 1), including 135 national immunization days, 147 subnational immunization days, 18 child health days, and 41 large-scale door-to-door immunization campaigns in areas where WPV was known or suspected to be circulating ("mopping-up" activities). One billion of the doses administered were trivalent (containing OPV types 1, 2, and 3), 1.1 billion were bivalent (types 1 and 3), and 79 million were monovalent type 1 OPV doses. SIAs in Afghanistan and Pakistan included those that were focused on children at border crossings from Pakistan, at borders of inaccessible districts, and at camps for refugees and internally displaced persons. In Nigeria, a national policy was adopted to respond to any new WPV case with multiple targeted SIAs.

Poliovirus Surveillance

Polio cases caused by WPV and cVDPV are detected through surveillance for cases of acute flaccid paralysis (AFP) among children aged <15 years, followed by testing of stool samples at a WHO-accredited laboratory in the Global Polio Laboratory Network (*8*). Surveillance performance is measured using two principal indicators: the rate of nonpolio AFP detected,* and the percentage of adequate stool samples collected.† Among the 29 countries reporting either WPV or cVDPV cases during 2010–2014, a total of 21 (72%) met both surveillance performance indicators at the national level in 2014. Although the polio-endemic countries met both indicators, review of epidemiologic, environmental, and other virologic evidence revealed important surveillance gaps in all three countries (*8*).

Reported Poliovirus Cases

During 2014, total of 359 WPV cases were identified (Figure 1); 306 (85%) were detected in Pakistan, 28 (8%) in Afghanistan, 6 (2%) in Nigeria, and 19 (5%) were in outbreaks following importation into previously polio-free countries in Central Africa (Equatorial Guinea and Cameroon), the Horn of Africa (Somalia and Ethiopia), and the Middle East (Iraq and Syria). During January 1–March 30, 2015, the low poliovirus transmission season, as of May 5, a total of 23 cases had been reported worldwide (22 from Pakistan, and one from Afghanistan). No cases were reported in nonendemic countries to date in 2015, compared with nine cases in five previously polio-free countries reported during the same period in 2014 (Table 2).

* Target = ≥1 case per 100,000 population aged <15 years for countries in WHO regions certified as polio-free; all other countries should achieve annual rates of ≥2.
† Target = ≥80%.

TABLE 1. Number of SIAs conducted and number of OPV doses administered, by WHO region — 2013–2014

WHO region	2013		2014	
	SIAs	OPV doses	SIAs	OPV doses
AFR	154	853,508,010	142	775,972,255
AMR	2	24,502,802	0	0
EMR	114	561,943,748	183	639,908,596
EUR	2	3,118,271	8	6,351,137
SEAR	10	872,106,871	6	800,605,667
WPR	1	361,446	2	32,827,615
Overall	**283**	**2,315,541,148**	**341**	**2,255,665,270**

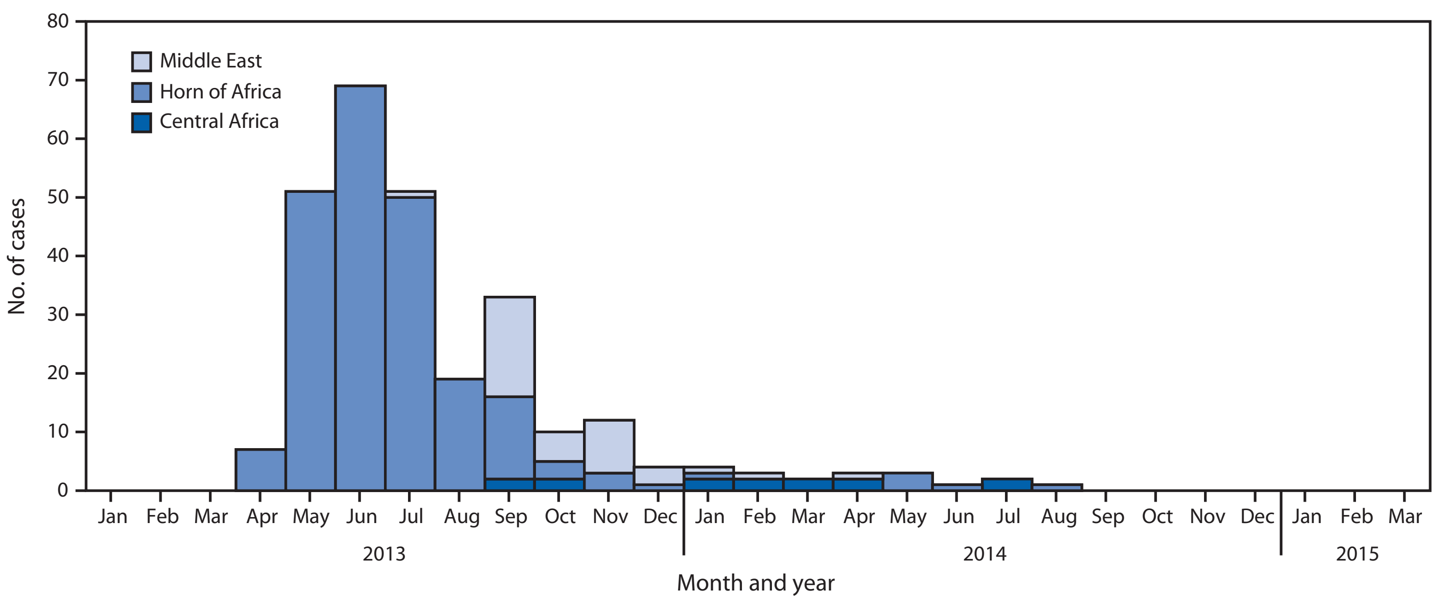
Abbreviations: OPV = oral poliovirus vaccine; SIAs = supplementary immunization activities; WHO = World Health Organization.
Region abbreviations: AFR = African Region; AMR = Region of the Americas; EMR = Eastern Mediterranean Region; EUR = European Region; SEAR = South-East Asia Region; WPR = Western Pacific Region.

Countries with endemic polio. Nigeria reported six WPV cases in five districts in 2014, compared with 53 cases in 30 districts in 2013 (Figure 2). No WPV cases have been detected in Nigeria since July 2014, although cVDPV type 2 (cVDPV2) cases did increase, from four cases in 2013 to 30 cases in 2014, all in northern states. One WPV case was an orphan virus, indicating less than the expected genetic linkage to other circulating viruses, and suggesting possible gaps in AFP surveillance (*9*). Security concerns continue to restrict access by vaccination personnel to some northeastern areas and limit the ability to detect cases in these regions; however, 100% of local government areas met both AFP surveillance quality indicators in 2014.

In Afghanistan, the number of reported WPV cases doubled in 2014, to 28 cases in 19 districts, compared with 14 cases in 10 districts the preceding year. In 2014, 46% of cases were reported from Kandahar province; most other cases were reported from provinces neighboring the Pakistan Federally Administered Tribal Areas (FATA). All but four cases in 2014 (86%) were genetically linked to WPV importation from Pakistan. Three cases in 2014 were caused by orphan viruses, including one case of indigenous Afghanistan WPV, suggesting ongoing, undetected, low-level transmission and gaps in surveillance (*10*). No cVDPV has been detected in Afghanistan since early 2013. During January 1–March 30, 2015, one WPV case was detected, compared with four cases during the same period in 2014.

The largest increase in reported WPV cases in polio-endemic countries in 2014 occurred in Pakistan, where 306 cases were reported in 44 districts, a 230% increase in cases and a 91% increase in affected districts compared with 2013. During January 1–March 30, 2015, a total of 22 WPV cases were reported, compared with 59 cases reported during the same period in 2014. Reported cVDPV2 cases also decreased, from 48 cases in 2013 to 21 in 2014. Because of the ongoing threat of violence against polio workers, SIAs continued to be suspended or abbreviated in 2014 and 2015 in areas of Pakistan, including parts of Karachi, Peshawar, and FATA. During June 2012–June 2014, vaccination campaigns were banned by local governmental authorities in specific parts of FATA (North Waziristan), leaving an estimated 300,000 children aged <5 years inaccessible to vaccination teams. In 2014, 56% of all WPV cases reported from Pakistan were in persons who had received no doses of OPV, compared with

FIGURE 1. Number of cases of wild poliovirus type 1 in countries with recent polio outbreaks, by territory* — January 1, 2013–March 30, 2015



* Central Africa (Cameroon and Equatorial Guinea), Horn of Africa (Ethiopia and Somalia), and Middle East (Iraq and Syria).

no such WPV cases in Nigeria and 18% of all WPV cases in Afghanistan. A military operation in Waziristan in June 2014 was followed by improved access to that area during SIAs; the campaign was preceded by movement of large numbers of the resident population into surrounding safer areas of Pakistan and into Afghanistan, including approximately 250,000 children aged <5 years. Vaccination posts were arranged along transit routes, creating an opportunity for the vaccination of 550,000 children of all ages.

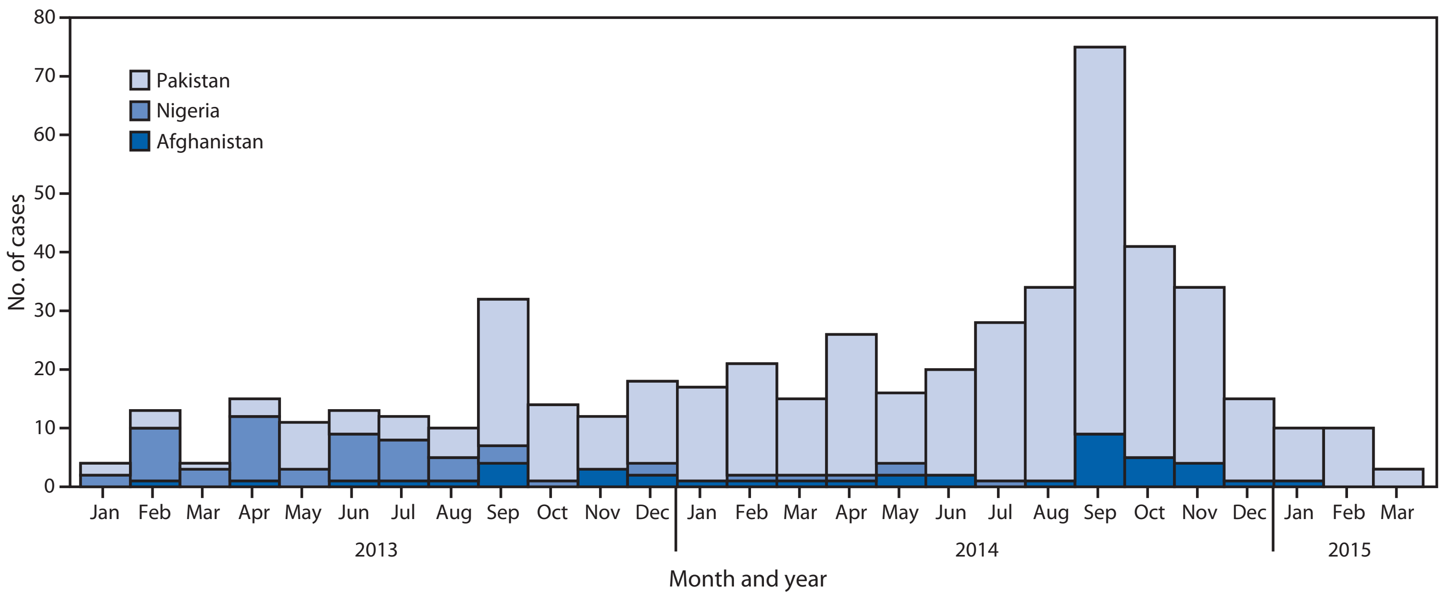
Outbreaks in polio-free countries. In 2014, a total of 19 WPV cases were reported in six previously polio-free countries, a 93% decrease from 2013, when 256 WPV cases were reported in five polio-free countries. A large outbreak in the Horn of Africa following an importation of WPV of Nigerian origin accounted for 54% of WPV cases globally in 2013; the

TABLE 2. Number of reported poliovirus cases, by country — worldwide, January–March 2014 and 2015*

	2014 (January–December)		2014 (January–March)		2015 (January–March)	
Country	**WPV**	**cVDPV**	**WPV**	**cVDPV**	**WPV**	**cVDPV**
Countries with endemic polio						
Afghanistan	28	0	4	0	1	0
Nigeria	6	30	2	2	0	0
Pakistan	306	21	59	10	22	0
Total	**340**	**51**	**65**	**12**	**23**	**0**
Countries without endemic polio						
Horn of Africa outbreak						
Somalia	5	0	0	0	0	0
Ethiopia	1	0	1	0	0	0
Central Africa outbreak						
Equatorial Guinea	5	0	3	0	0	0
Cameroon	5	0	3	0	0	0
Middle East outbreak						
Iraq	2	0	1	0	0	0
Syria	1	0	1	0	0	0
Other countries with reported cVDPV cases						
South Sudan	0	2	0	0	0	0
Madagascar	0	1	0	0	0	0
Total	**19**	**3**	**9**	**0**	**0**	**0**
Overall	**359**	**54**	**74**	**12**	**23**	**0**

Abbreviations: cVDPV = circulating vaccine-derived poliovirus; WPV = wild poliovirus.
* Available data as of May 5, 2015.

FIGURE 2. Number of cases of wild poliovirus type 1 among countries with endemic poliovirus transmission, by country — January 1, 2013–March 30, 2015



What is already known on this topic?

Wild poliovirus (WPV) transmission now remains endemic only in Afghanistan, Nigeria, and Pakistan. During 2013–2014, outbreaks resulting from importation of WPV from those three countries occurred in eight previously polio-free countries in three world territories, threatening the progress made to date in achieving polio eradication.

What is added by this report?

In 2015, all three of the regional polio outbreaks in 2014 appear controlled, and reported WPV cases have decreased worldwide. No new cases have been detected in Nigeria since July 2014. However, transmission in Pakistan and Afghanistan continue in 2015, and control efforts are challenged by ongoing areas of insecurity.

What are the implications for public health practice?

Polio eradication appears increasingly feasible in the near future, bolstered by possible elimination of endemic WPV transmission from Nigeria and interruption of all the 2013–2014 outbreaks. The recent gains in polio control must build on continued coordinated commitment to improve childhood immunization in areas with low population immunity, strengthen acute flaccid paralysis surveillance, and use innovative strategies to access populations with supplemental immunization activities in the face of complex security and political challenges.

most recent case related to this outbreak occurred in Somalia on August 11, 2014. In late 2013 and early 2014, an outbreak affected Cameroon and Equatorial Guinea in Central Africa after a WPV importation of Nigerian origin. Onset of the most recent outbreak-related case was on July 9, 2014, in Cameroon. An exportation of WPV from Pakistan led to an outbreak including 36 cases in Syria and two in Iraq during 2013–2014; the most recent case related to this outbreak occurred on April 7, 2014, in Iraq.

Discussion

Four of six WHO regions have been certified as free of indigenous WPV, and endemic transmission of WPV continued in only three countries in 2014. In 2013, the global polio eradication effort suffered setbacks with outbreaks in the Horn of Africa, Central Africa, and the Middle East; however, significant progress was made in 2014 in response to all three outbreaks. Nonetheless, the affected regions remain vulnerable to WPV re-importation from endemic areas and to low-level, undetected WPV circulation. Continued response activities are needed in these regions to further strengthen AFP surveillance and eliminate immunity gaps through high-quality SIAs and strong routine immunization programs.

Progress in Nigeria since 2012 has brought the goal of interrupting the last known chains of indigenous WPV transmission in Africa within reach. Elimination of all poliovirus transmission in Nigeria in the near term is feasible, through intensified efforts to 1) interrupt cVDPV2 transmission, 2) strengthen routine immunization services, and 3) increase access to children in insecure areas. Similar efforts should be implemented in all countries in Africa, where 9 months have passed without a reported WPV case, and 6 months have passed since the last reported cVDPV2 case. Undetected circulation or re-importation of WPV into vulnerable countries such as those affected by the Ebola epidemic in West Africa, which suffered damage to routine health systems and deferment of polio SIAs, threatens recent progress in Africa.

Most (86%) WPV cases in Afghanistan in 2014 resulted from importation from Pakistan; however, the detection of orphan viruses highlights the need to strengthen the quality of both polio vaccination and AFP surveillance (*10*). Efforts are also needed to increase population immunity by intensifying routine polio immunization activities to ensure high coverage among infants with at least 3 OPV doses.

Recent challenges to the secure operation and public acceptance of the polio eradication program in Pakistan are unprecedented (*10*). Although poliovirus transmission has been concentrated primarily in the FATA region of northwest Pakistan, transmission has continued in the greater Karachi area, and WPV cases have been reported from all major Pakistan provinces. Successful efforts to enhance security to protect health workers and increase public demand for vaccination are urgently needed.

The recent gains in control and elimination of poliovirus transmission globally must be maintained and built upon through innovative strategies to access populations during SIAs in areas with complex security and political challenges, improve AFP surveillance, and strengthen routine immunization. With the progress achieved in 2014 to interrupt endemic WPV transmission in Nigeria and polio outbreaks in Africa and the Middle East, permanent interruption of global poliovirus transmission appears possible in the near future, provided that similar progress can be made in Afghanistan and Pakistan; progress there would also reduce the risk for future importation-related outbreaks in polio-free countries.

[1]Epidemic Intelligence Service, CDC; [2]Global Immunization Division, Center for Global Health, CDC; [3]Polio Eradication Department, World Health Organization; [4]Division of Viral Diseases, National Center for Immunization and Respiratory Diseases, CDC.

Corresponding author: José E. Hagan, jehagan@cdc.gov; 404-718-6351.

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State-Specific Prevalence of Current Cigarette Smoking and Smokeless Tobacco Use Among Adults Aged ≥18 Years — United States, 2011–2013

Kimberly Nguyen, MS[1]; LaTisha Marshall, MPH[1]; Sean Hu, DrPH[1]; Linda Neff, PhD[1] (Author affiliations at end of text)

Cigarette smoking and the use of smokeless tobacco both cause substantial morbidity and premature mortality (*1,2*). The concurrent use of these products might increase dependence and the risk for tobacco-related disease and death (*1,2*). State-specific estimates of prevalence and relative percent change in current cigarette smoking, smokeless tobacco use, and concurrent cigarette smoking and smokeless tobacco use among U.S. adults during 2011–2013, developed using data from the Behavioral Risk Factor Surveillance System (BRFSS), indicate statistically significant (p<0.05) changes for all three behaviors. From 2011 to 2013, there was a statistically significant decline in current cigarette smoking prevalence overall and in 26 states. During the same period, use of smokeless tobacco significantly increased in four states: Louisiana, Montana, South Carolina, and West Virginia; significant declines were observed in two states: Ohio and Tennessee. In addition, the use of smokeless tobacco among cigarette smokers (concurrent use) significantly increased in five states (Delaware, Idaho, Nevada, New Mexico, and West Virginia). Although annual decreases in overall cigarette smoking among adults in the United States have occurred in recent years (*2*), there is much variability in prevalence of cigarette smoking, smokeless tobacco, and concurrent use across states. In 2013, the prevalence ranged from 10.3% (Utah) to 27.3% (West Virginia) for cigarette smoking; 1.5% (District of Columbia and Massachusetts) to 9.4% (West Virginia) for smokeless tobacco; and 3.1% (Vermont) to 13.5% (Idaho) for concurrent use. These findings highlight the importance of sustained comprehensive state tobacco-control programs funded at CDC-recommended levels, which can accelerate progress toward reducing tobacco-related disease and deaths by promoting evidence-based population-level interventions. These interventions include increasing the price of tobacco products, implementing comprehensive smoke-free laws, restricting tobacco advertising and promotion, controlling access to tobacco products, and promoting cessation assistance for smokers to quit, as well as continuing and implementing mass media campaigns that contain graphic anti-smoking ads, such as the Tips from Former Smokers (TIPS) campaign (*3*).

BRFSS is a state-based telephone survey of noninstitutionalized U.S. adults aged ≥18 years; in 2011, the survey began using data obtained from both landline and cell phone samples. The median state response rates during 2011–2013 were 49.7% (2011), 45.2% (2012), and 45.9% (2013). The survey assessed prevalence of current cigarette smoking* and current smokeless tobacco use.† State-specific point prevalence for current cigarette smoking and current smokeless tobacco use was calculated for all 50 U.S. States and the District of Columbia. In addition, the prevalence of smokeless tobacco use among cigarette smokers was calculated to determine an estimate of concurrent use of both products. Estimates were weighted to adjust for differences in the probability of selection and nonresponse, and 95% confidence intervals were computed.§ The relative percent change (RPC) in prevalence during 2011–2013 was also calculated.¶ Logistic regression was used to assess trends over time adjusting for sex, age, and race/ethnicity; the Wald test was used to determine statistical significance (p<0.05). The analysis was restricted to 2011–2013 because of a change in the weighting methodology and the addition of cell phone samples beginning in 2011.**

Current cigarette smoking ranged from 11.8% (Utah) to 29.0% (Kentucky) in 2011 and from 10.3% (Utah) to 27.3% (West Virginia) in 2013 (Table 1). During 2011–2013, current cigarette smoking declined significantly in 26 states: Arizona, Florida, Georgia, Hawaii, Illinois, Indiana, Kansas, Kentucky, Maine, Maryland, Michigan, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Mexico, Oklahoma, Oregon, Rhode Island, South Dakota, Texas, Utah, Vermont, Wisconsin, and Wyoming (Figure 1). No significant changes were observed in any other states.

Current smokeless tobacco use ranged from 1.4% (California and Rhode Island) to 9.8% (Wyoming) in 2011 and from 1.5% (District of Columbia and Massachusetts) to 9.4% (West Virginia) in 2013 (Table 1). Increases (RPCs) were observed

* Current cigarette smoking was assessed by two questions, "Have you smoked at least 100 cigarettes in your entire life?" and "Do you now smoke cigarettes every day, some days, or not at all?" Respondents who reported smoking at least 100 cigarettes in their lifetime and who reported currently smoking "every day" or "some days" were classified as current cigarette smokers.

† Respondents were classified as current smokeless tobacco users if they answered "every day" or "some days" to the following question, "Do you currently use chewing tobacco, snuff, or snus every day, some days, or not at all?" Snus (rhymes with "goose") is a Swedish word for snuff and refers to a moist smokeless tobacco that is usually sold in small pouches that are placed under the lip against the gum.

§ Additional information available at http://www.cdc.gov/brfss/annual_data/2013/pdf/Weighting_Data.pdf.

¶ The RPC was calculated by dividing the difference between the 2013 and 2011 estimates by the 2011 estimates, and expressed as a percentage.

** Additional information available at http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6122a3.htm.

TABLE 1. State-specific prevalence of current cigarette smoking* and current smokeless tobacco use† among adults aged ≥18 years, by state/territory — Behavioral Risk Factor Surveillance System, United States, 2011–2013

	Cigarette smoking							Smokeless tobacco						
	2011		2012		2013			2011		2012		2013		
State/Territory	%	(95% CI)	%	(95% CI)	%	(95% CI)	RPC[§]	%	(95% CI)	%	(95% CI)	%	(95% CI)	RPC
Alabama	24.3	(22.9–25.8)	23.8	(22.4–25.2)	21.5	(19.9–23.1)	11.5	6.5	(5.7–7.4)	5.8	(5.0–6.6)	6.1	(5.2–7.1)	-6.2
Alaska	22.9	(21.0–25.0)	20.5	(18.9–22.3)	22.6	(20.8–24.4)	-1.3	5.9	(4.9–7.1)	6.1	(5.2–7.1)	6.8	(5.8–7.8)	15.3
Arizona	19.3	(17.2–21.3)	17.1	(15.6–18.6)	16.3	(14.4–18.4)	-15.5[¶]	3.1	(2.4–4.0)	3.1	(2.5–3.9)	3.2	(2.4–4.2)	3.2
Arkansas	27.0	(24.8–29.2)	25.0	(23.4–26.8)	25.9	(24.1–27.8)	-4.1	7.1	(5.8–8.5)	7.1	(6.1–8.3)	6.9	(5.9–8.0)	-2.8
California	13.7	(12.9–14.4)	12.6	(11.8–13.4)	12.5	(11.7–13.5)	-8.8	1.4	(1.2–1.7)	1.3	(1.1–1.6)	1.6	(1.2–1.9)	14.3
Colorado	18.3	(17.2–19.4)	17.7	(16.8–18.7)	17.7	(16.8–18.6)	-3.3	4.5	(3.9–5.1)	4.2	(3.7–4.8)	4.2	(3.8–4.8)	-6.7
Connecticut	17.1	(15.8–18.6)	16.0	(14.9–17.2)	15.5	(14.3–16.8)	-9.4	1.5	(1.2–2.0)	1.9	(1.5–2.4)	1.8	(1.4–2.5)	20.0
Delaware	21.8	(19.9–23.6)	19.7	(18.2–21.3)	19.6	(18.0–21.2)	-10.1	2.2	(1.6–2.9)	2.5	(1.9–3.3)	2.2	(1.7–2.9)	0.0
District of Columbia	20.8	(18.8–22.9)	19.6	(17.4–22.0)	18.8	(16.9–20.9)	-9.6	1.5	(1.0–2.2)	1.6	(0.9–2.8)	1.5	(0.9–2.3)	0.0
Florida	19.3	(18.2–20.5)	17.7	(16.3–19.2)	16.8	(16.0–17.8)	-13.0[¶]	3.0	(2.5–3.6)	3.2	(2.6–3.9)	2.6	(2.3–3.0)	-13.3
Georgia	21.2	(19.9–22.6)	20.4	(18.9–22.0)	18.8	(17.6–20.1)	-11.3[¶]	4.4	(3.8–5.1)	4.1	(3.4–4.9)	5.0	(4.3–5.8)	13.6
Hawaii	16.8	(15.5–18.3)	14.6	(13.3–15.9)	13.3	(12.2–14.5)	-20.8[¶]	1.9	(1.4–2.4)	2.0	(1.5–2.6)	1.7	(1.3–2.1)	-10.5
Idaho	17.2	(15.6–18.9)	16.4	(14.7–18.3)	17.2	(15.7–18.8)	0.0	4.8	(4.0–5.8)	4.9	(3.9–6.1)	5.7	(4.7–6.8)	18.8
Illinois	20.9	(19.2–22.7)	18.6	(17.0–20.3)	18.0	(16.6–19.6)	-13.9[¶]	3.4	(2.7–4.2)	2.5	(1.8–3.3)	2.6	(2.0–3.3)	-23.5
Indiana	25.6	(24.3–27.0)	24.0	(22.8–25.2)	21.9	(20.8–23.1)	-14.5[¶]	5.0	(4.3–5.8)	4.0	(3.5–4.7)	4.9	(4.3–5.5)	-2.0
Iowa	20.4	(19.1–21.6)	18.1	(17.0–19.3)	19.5	(18.3–20.7)	-4.4	4.2	(3.6–4.9)	4.3	(3.7–5.1)	4.9	(4.2–5.7)	16.7
Kansas	22.0	(21.2–22.8)	19.4	(18.4–20.4)	20.0	(19.3–20.7)	-9.1[¶]	5.3	(4.9–5.8)	5.5	(4.9–6.2)	5.5	(5.1–5.9)	3.8
Kentucky	29.0	(27.5–30.5)	28.3	(26.9–29.7)	26.5	(25.1–27.8)	-8.6[¶]	6.8	(6.0–7.6)	6.1	(5.4–6.9)	7.0	(6.3–7.9)	2.9
Louisiana	25.7	(24.3–27.2)	24.8	(23.2–26.3)	23.5	(21.5–25.6)	-8.6	4.5	(3.8–5.2)	5.6	(4.8–6.5)	5.7	(4.7–6.9)	26.7[¶]
Maine	22.8	(21.7–23.9)	20.3	(19.2–21.4)	20.2	(19.0–21.5)	-11.4[¶]	2.8	(2.4–3.3)	2.2	(1.9–2.7)	2.0	(1.6–2.6)	-28.6
Maryland	19.1	(17.8–20.5)	16.2	(15.0–17.4)	16.4	(15.3–17.5)	-14.1[¶]	2.1	(1.7–2.7)	2.0	(1.5–2.5)	2.5	(2.0–3.1)	19.0
Massachusetts	18.2	(17.3–19.2)	16.4	(15.6–17.2)	16.6	(15.6–17.7)	-8.8	1.7	(1.4–2.1)	1.3	(1.1–1.6)	1.5	(1.2–1.9)	-11.8
Michigan	23.3	(22.0–24.6)	23.3	(22.1–24.6)	21.4	(20.3–22.5)	-8.2[¶]	4.4	(3.8–5.1)	3.9	(3.3–4.5)	3.9	(3.5–4.5)	-11.4
Minnesota	19.1	(18.1–20.1)	18.8	(17.8–19.8)	18.0	(16.9–19.3)	-5.8	4.8	(4.3–5.4)	4.2	(3.7–4.7)	5.0	(4.3–5.8)	4.2
Mississippi	26.0	(24.6–27.4)	24.0	(22.5–25.5)	24.8	(23.3–26.4)	-4.6	8.0	(7.2–8.9)	7.5	(6.6–8.4)	8.5	(7.5–9.6)	6.3
Missouri	25.0	(23.5–26.6)	23.9	(22.4–25.5)	22.1	(20.6–23.6)	-11.6[¶]	5.3	(4.5–6.2)	5.1	(4.3–6.0)	5.1	(4.4–6.0)	-3.8
Montana	22.1	(20.8–23.4)	19.7	(18.6–20.9)	19.0	(17.9–20.1)	-14.0[¶]	7.1	(6.4–7.9)	8.0	(7.2–8.8)	8.0	(7.3–8.8)	12.7[¶]
Nebraska	20.0	(19.3–20.7)	19.7	(18.9–20.6)	18.5	(17.5–19.5)	-7.5[¶]	5.6	(5.2–6.0)	5.1	(4.6–5.6)	5.3	(4.7–5.9)	-5.4
Nevada	22.9	(21.0–25.0)	18.1	(16.6–19.8)	19.4	(17.4–21.5)	-15.3[¶]	2.3	(1.7–3.1)	3.7	(2.9–4.7)	3.2	(2.5–3.9)	39.1
New Hampshire	19.4	(18.0–20.9)	17.2	(15.8–18.6)	16.2	(15.0–17.6)	-16.5[¶]	3.0	(2.3–3.8)	2.1	(1.6–2.7)	2.7	(2.1–3.3)	-10.0
New Jersey	16.8	(15.9–17.8)	17.3	(16.4–18.3)	15.7	(14.7–16.7)	-6.5	1.6	(1.3–2.0)	1.2	(1.0–1.5)	1.7	(1.4–2.1)	6.2
New Mexico	21.5	(20.3–22.7)	19.3	(18.2–20.5)	19.1	(17.9–20.3)	-11.2[¶]	4.2	(3.6–4.9)	4.3	(3.7–4.9)	4.3	(3.8–5.0)	2.4
New York	18.1	(16.9–19.4)	16.2	(14.9–17.6)	16.6	(15.5–17.8)	-8.3	2.3	(1.8–2.9)	1.9	(1.5–2.4)	2.2	(1.8–2.6)	-4.3
North Carolina	21.8	(20.5–23.1)	20.9	(19.9–21.9)	20.3	(19.1–21.5)	-6.9	5.2	(4.5–5.9)	4.1	(3.6–4.6)	4.3	(3.7–5.0)	-17.3
North Dakota	21.9	(20.3–23.5)	21.2	(19.6–22.9)	21.2	(19.8–22.7)	-3.2	7.6	(6.5–8.7)	7.3	(6.2–8.5)	7.6	(6.7–8.6)	0.0
Ohio	25.1	(23.8–26.4)	23.3	(22.2–24.4)	23.4	(22.2–24.6)	-6.8	5.0	(4.3–5.7)	4.6	(4.1–5.2)	4.2	(3.7–4.8)	-16.0[¶]
Oklahoma	26.1	(24.7–27.6)	23.3	(22.0–24.6)	23.7	(22.4–25.0)	-9.2[¶]	6.9	(6.1–7.9)	6.7	(5.9–7.5)	6.3	(5.6–7.1)	-8.7
Oregon	19.7	(18.3–21.2)	17.9	(16.4–19.4)	17.3	(15.9–18.8)	-12.2[¶]	4.4	(3.7–5.2)	3.8	(3.1–4.8)	4.6	(3.8–5.4)	4.5
Pennsylvania	22.4	(21.3–23.6)	21.4	(20.4–22.3)	21.0	(19.9–22.0)	-6.2	4.4	(3.9–5.1)	4.3	(3.8–4.7)	4.4	(3.8–4.9)	0.0
Rhode Island	20.0	(18.6–21.5)	17.4	(16.0–18.9)	17.4	(16.1–18.8)	-13.0[¶]	1.4	(1.0–1.9)	1.0	(0.7–1.4)	1.9	(1.4–2.6)	35.7
South Carolina	23.1	(21.9–24.4)	22.5	(21.4–23.7)	22.0	(20.8–23.2)	-4.8	3.6	(3.1–4.2)	3.9	(3.3–4.5)	4.4	(3.8–5.1)	22.2[¶]
South Dakota	23.0	(21.1–25.0)	22.0	(20.5–23.5)	19.6	(18.1–21.2)	-14.8[¶]	6.8	(5.7–8.2)	6.4	(5.5–7.3)	6.6	(5.6–7.7)	-2.9
Tennessee	23.0	(20.7–25.5)	24.9	(23.4–26.4)	24.3	(22.6–26.1)	5.7	6.4	(5.0–8.1)	5.0	(4.3–5.9)	4.8	(3.9–5.9)	-25.0[¶]
Texas	19.2	(18.0–20.4)	18.2	(17.0–19.4)	15.9	(14.8–17.0)	-17.2[¶]	3.9	(3.4–4.5)	3.9	(3.4–0.2)	4.3	(3.7–4.9)	10.3
Utah	11.8	(11.0–12.7)	10.6	(9.8–11.4)	10.3	(9.6–11.1)	-12.7[¶]	3.0	(2.6–3.5)	3.0	(2.5–3.5)	2.9	(2.5–3.3)	-3.3
Vermont	19.1	(17.7–20.5)	16.5	(15.2–17.9)	16.6	(15.4–17.9)	-13.1[¶]	2.7	(2.1–3.3)	3.0	(2.4–3.8)	2.8	(2.2–3.5)	3.7
Virginia	20.9	(19.4–22.5)	19.0	(17.7–20.3)	19.0	(17.9–20.2)	-9.1	4.3	(3.6–5.2)	4.3	(3.7–5.2)	4.0	(2.2–3.5)	-7.0
Washington	17.5	(16.4–18.7)	17.2	(16.3–18.1)	16.1	(15.1–17.1)	-8.0	3.6	(3.0–4.2)	3.8	(3.3–4.3)	3.7	(3.4–4.6)	2.8[¶]
West Virginia	28.6	(27.0–30.3)	28.2	(26.7–29.7)	27.3	(25.9–28.7)	-4.5	7.5	(6.6–8.5)	8.6	(7.7–9.6)	9.4	(8.5–10.5)	25.3[¶]
Wisconsin	20.9	(19.2–22.7)	20.4	(18.7–22.1)	18.7	(17.2–20.3)	-10.5[¶]	4.0	(3.3–4.8)	4.3	(3.5–5.2)	4.3	(3.6–5.2)	7.5
Wyoming	23.0	(21.5–24.6)	21.8	(19.9–23.7)	20.6	(19.1–22.2)	-10.4[¶]	9.8	(8.9–10.9)	8.2	(7.0–9.6)	8.8	(7.7–10.0)	-10.2
Median prevalence all states**	**21.2**		**19.6**		**19.0**		**-10.4[¶]**	**4.4**		**4.1**		**4.3**		**2.3**

Abbreviations: CI = confidence interval; RPC = relative percent change (see below).

* Persons aged ≥18 years who reported having smoked ≥100 cigarettes during their lifetime and smoke every day or some days at the time of survey.

† Persons aged ≥18 years who reported currently using chewing tobacco, snuff, or snus (a small pouch of smokeless tobacco) every day or some days at the time of survey.

§ RPC was calculated by dividing the difference between the 2013 and 2011 estimates by the 2011 estimates, and expressed as a percentage.

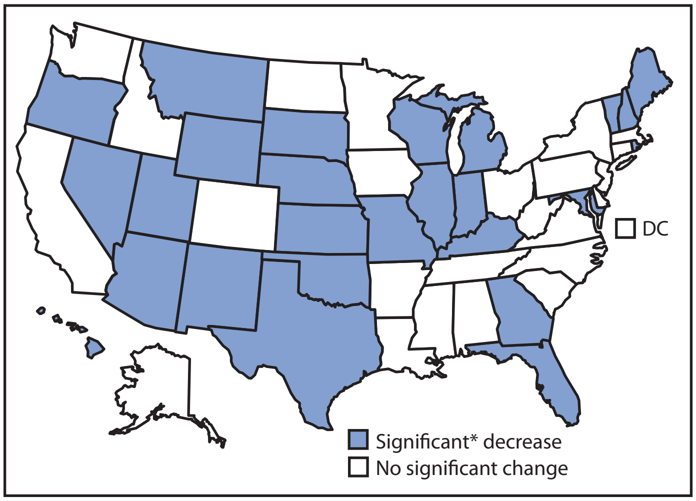
¶ p<0.05 for trend (2011–2013) in multivariate logistic regression model adjusted for sex, age, and race/ethnicity.

** Median prevalence across all 50 U.S. states and the District of Columbia.

in four states: Louisiana (26.7%), Montana (12.7%), South Carolina (22.2%), and West Virginia (25.3%), while declines were observed in smokeless tobacco use in two states: Ohio (-16.0%) and Tennessee (-25.0%) (Figure 2).

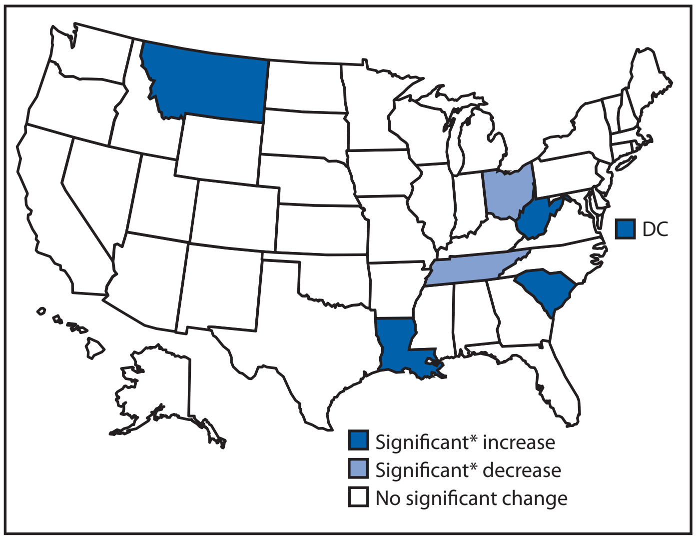
The prevalence of concurrent use of cigarettes and smokeless tobacco ranged from 2.0% (Nevada) to 12.5% (Utah) in 2011, and from 3.1% (Vermont) to 13.5% (Idaho) in 2013 (Table 2). Significant increases (RPCs) in concurrent use were

FIGURE 1. Change in percentage of current cigarette smoking among adults — Behavioral Risk Factor Surveillance System, United States, 2011–2013



* Significant = p<0.05.

FIGURE 2. Change in percentage of current smokeless tobacco use among adults — Behavioral Risk Factor Surveillance System, United States, 2011–2013



* Significant = p<0.05.

observed in five states: Delaware (100.0%), Idaho (57.0%), Nevada (155.0%), New Mexico (25.4%), and West Virginia (31.3%); no significant changes were observed in other states.

Discussion

States vary widely in prevalence of cigarette smoking, smokeless tobacco, and concurrent use of both products. The overall prevalence of current cigarette smoking declined significantly in approximately half of U.S. states during 2011–2013; however, there has been relatively little change in the prevalence of current smokeless tobacco or concurrent use of cigarettes and smokeless tobacco in most states during this period, with prevalence increasing in some states. The use of more than one tobacco product is concerning because persons aged ≥18 years who use both cigarettes and smokeless tobacco have higher levels of nicotine dependence and are less likely to report planning to quit than those who exclusively smoke cigarettes (*4*). Although multiple components of tobacco control prevention and policy have had an effect on reducing cigarette smoking overall and within most states (*2*), the varied prevalence and increases in smokeless tobacco use in some states highlights the importance of targeted population-based interventions focused on reducing the use of all tobacco products.

Although a statistically significant change in cigarette smoking prevalence occurred in 26 states, no change occurred in 24 states and the District of Columbia. In addition, smokeless tobacco use prevalence decreased in only two states (Ohio and Tennessee), while prevalence increased in four states (Louisiana, Montana, South Carolina, and West Virginia). Smokeless tobacco use among current cigarette smokers increased by more than 50% in one state (Idaho) and more than doubled in two states (Delaware and Nevada). These increases could be attributable to increases in marketing of smokeless tobacco, the misperception that smokeless tobacco is a safe alternative to cigarettes, and the lower price of smokeless tobacco products relative to cigarettes in most states (*1*,*4*). In addition, the tobacco industry has marketed smokeless tobacco as an alternative in areas where smoking is otherwise prohibited (*5*). As of

What is already known on this topic?

Cigarette smoking and the use of smokeless tobacco both cause substantial morbidity and premature mortality. The concurrent use of these products might increase dependence and the risk for tobacco-related disease and death.

What is added by this report?

During 2011–2013, cigarette smoking prevalence declined significantly in 26 states. However, smokeless tobacco use declined in only two states (Ohio and Tennessee) and increased in four states (Louisiana, Montana, South Carolina, and West Virginia). A significant increase in concurrent use of cigarettes and smokeless tobacco was observed in five states (Delaware, Idaho, Nevada, New Mexico, and West Virginia).

What are the implications for public health practice?

The findings in this report underscore the importance of implementing proven interventions for reducing the use of all tobacco products. Full implementation of comprehensive tobacco control programs at CDC-recommended funding levels, in conjunction with the Food and Drug Administration regulation of tobacco products, could reduce tobacco use and change social norms regarding the acceptability of tobacco use in the United States.

TABLE 2. Percentage of current cigarette smokers* who also currently use smokeless tobacco† among adults aged ≥18 years, by state/territory — Behavioral Risk Factor Surveillance System, United States, 2011–2013

	2011		2012		2013		
State/Territory	**%**	**95% CI**	**%**	**95% CI**	**%**	**95% CI**	**RPC§**
Alabama	8.5	(6.5–11.1)	6.1	(4.6–8.1)	7.9	(6.0–10.5)	-7.1
Alaska	7.9	(5.7.11.0)	8.6	(6.5–11.5)	8.8	(6.5–11.6)	11.4
Arizona	5.5	(3.5–8.5)	5.4	(3.6–7.9)	7.4	(4.6–11.6)	34.5
Arkansas	11.3	(8.1–15.5)	8.0	(5.9–10.8)	8.7	(6.6–11.4)	-23.0
California	4.2	(3.1–5.6)	3.3	(2.4–4.5)	3.6	(2.3–5.7)	-14.3
Colorado	7.8	(6.1–10.0)	5.3	(4.1–6.9)	7.8	(6.2–9.7)	0.0
Connecticut	2.8	(1.8–4.3)	6.6	(4.6–9.2)	3.7	(2.2–6.1)	32.1
Delaware	2.9	(1.7–5.1)	5.5	(3.5–8.6)	5.8	(3.8–8.9)	100.0¶
District of Columbia	4.6	(2.8–7.4)	4.2	(1.8–9.3)	4.6	(2.4–8.6)	0.0
Florida	5.6	(4.2–7.4)	6.2	(4.1–9.2)	5.2	(4.0–6.7)	-7.1
Georgia	7.7	(5.7–10.4)	6.5	(4.6–9.2)	7.3	(5.6–9.5)	-5.2
Hawaii	3.9	(2.5–5.9)	5.6	(3.8–8.1)	4.4	(3.0–6.5)	12.8
Idaho	8.6	(6.0–12.2)	8.2	(5.3–12.4)	13.5	(10.2–17.7)	57.0¶
Illinois	5.8	(3.8–8.8)	5.5	(3.1–9.5)	5.4	(3.7–7.8)	-6.9
Indiana	7.4	(5.8–9.6)	6.1	(4.6–7.9)	7.8	(6.3–9.6)	5.4
Iowa	7.9	(6.0–10.4)	5.1	(3.7–7.1)	7.5	(5.7–10.0)	-5.1
Kansas	8.0	(6.8–9.4)	7.0	(5.5–8.8)	8.3	(7.2–9.5)	3.8
Kentucky	8.9	(7.2–11.0)	7.4	(5.8–9.4)	10.2	(8.4–12.4)	14.6
Louisiana	6.7	(5.0–8.9)	6.9	(5.2–9.1)	6.6	(4.4–9.9)	-1.5
Maine	5.1	(3.8–6.7)	5.2	(3.8–7.0)	3.9	(2.7–5.6)	-23.5
Maryland	4.5	(2.9–6.8)	4.0	(2.6–6.1)	5.5	(3.9–7.8)	22.2
Massachusetts	4.3	(3.1–5.8)	2.1	(1.5–2.9)	4.0	(2.7–6.0)	-7.0
Michigan	9.6	(7.7–11.8)	6.7	(5.3–8.4)	8.9	(7.4–10.7)	-7.3
Minnesota	9.2	(7.5–11.2)	8.1	(6.7–9.9)	9.6	(7.6–12.1)	4.3
Mississippi	10.4	(8.4–12.7)	9.4	(7.3–12.1)	10.0	(7.9–12.5)	-3.8
Missouri	7.0	(5.1–9.5)	7.6	(5.5–10.3)	6.4	(4.7–8.5)	-8.6
Montana	10.2	(8.4–12.3)	11.6	(9.5–14.0)	12.2	(10.2–14.4)	19.6
Nebraska	9.4	(8.2–10.8)	7.9	(6.6–9.5)	9.0	(7.2–11.4)	-4.3
Nevada	2.0	(1.1–3.8)	5.1	(3.2–8.0)	5.1	(3.4–7.7)	155.0¶
New Hampshire	6.8	(4.6–10.0)	4.0	(2.3–6.9)	5.3	(3.6–7.9)	-22.1
New Jersey	3.1	(2.2–4.6)	3.0	(2.1–4.3)	4.0	(2.8–5.7)	29.0
New Mexico	7.1	(5.4–9.3)	7.4	(5.8–9.4)	8.9	(7.2–11.1)	25.4¶
New York	5.2	(3.7–7.1)	6.5	(4.8–8.9)	5.3	(4.0–7.0)	1.9
North Carolina	6.5	(4.9–8.7)	5.3	(4.2–6.7)	5.6	(4.1–7.5)	-13.8
North Dakota	11.0	(8.4–14.2)	11.0	(8.3–14.5)	11.3	(9.1–14.0)	2.7
Ohio	6.2	(4.8–8.1)	7.6	(6.2–9.2)	6.4	(5.1–8.0)	3.2
Oklahoma	8.8	(6.8–11.2)	8.7	(6.9–10.8)	7.6	(6.0–9.6)	-13.6
Oregon	7.4	(5.3–10.1)	5.5	(3.5–8.4)	8.7	(6.4–11.6)	17.6
Pennsylvania	7.4	(6.0–9.3)	6.6	(5.3–8.1)	7.4	(6.0–9.1)	0.0
Rhode Island	4.3	(2.9–6.4)	2.0	(1.1–3.6)	5.5	(3.4–8.8)	27.9
South Carolina	5.6	(4.3–7.3)	5.5	(4.2–7.3)	6.3	(4.8–8.2)	12.5
South Dakota	10.0	(7.1–13.9)	7.8	(6.1–9.9)	9.1	(6.6–12.3)	-9.0
Tennessee	8.1	(4.8–13.2)	6.2	(4.6–8.4)	5.8	(4.0–8.4)	-28.4
Texas	8.8	(6.9–11.2)	7.5	(5.8–9.6)	8.2	(6.5–10.4)	-6.8
Utah	12.5	(10.2–15.2)	10.3	(8.0–13.2)	10.2	(8.1–12.9)	-18.4
Vermont	5.7	(4.0–8.2)	5.4	(3.7–7.7)	3.1	(2.0–4.8)	-45.6
Virginia	6.8	(4.8–9.2)	7.7	(5.5–10.7)	7.1	(5.5–9.1)	4.4
Washington	6.9	(5.1–9.2)	8.6	(7.0–10.5)	9.0	(7.1–11.2)	30.4
West Virginia	6.4	(4.8–8.5)	7.9	(6.2–9.9)	8.4	(6.7–10.6)	31.3¶
Wisconsin	8.2	(6.0–10.9)	7.9	(5.7–10.9)	8.3	(6.1–11.2)	1.2
Wyoming	11.6	(9.4–14.2)	12.1	(8.9–16.2)	12.8	(9.8–16.5)	10.3
Median prevalence all states**	**7.1**		**6.6**		**7.4**		**4.2**

Abbreviations: CI = confidence interval; RPC = relative percent change (see below).
* Persons aged ≥18 years who reported having smoked ≥100 cigarettes during their lifetime and smoke every day or some days at the time of survey.
† Persons aged ≥18 years who reported currently using chewing tobacco, snuff, or snus (a small pouch of smokeless tobacco) every day or some days at the time of survey.
§ RPC was calculated by dividing the difference between the 2013 and 2011 estimates by the 2011 estimates, and expressed as a percentage.
¶ $p<0.05$ for trend (2011–2013) in multivariate logistic regression model adjusted for sex, age, and race/ethnicity.
** Median prevalence across all 50 U.S. states and the District of Columbia.

January 2015, a total of 26 states (not necessarily those that saw smoking decreases) and the District of Columbia have implemented comprehensive smoke-free laws that prohibit smoking in all indoor areas of worksites, restaurants, and bars (*6*).

This report provides the most recent state-based estimates of current cigarette smoking and smokeless tobacco use for all 50 states and the District of Columbia. The estimates are produced using new weighting methods (e.g., raking) in BRFSS that include both landline and cell phone-only households to increase generalizability.[§] However, this study is subject to at least three limitations. First, the estimates for tobacco use were self-reported. Although studies of self-reported smoking have been shown to yield lower prevalence estimates than studies using serum cotinine (*7*), a metabolite of nicotine, underreporting likely did not have a large effect on the trends described in this report (*8*). Second, the BRFSS sampling frame does not include adults without telephone service; however, their exclusion would not be expected to introduce any major bias because only 1.8% of U.S. adults reported having no telephone service in 2011 (*9*). Finally, the median state response rates ranged from 49.7% (2011), 45.2% (2012), and 45.9% (2013). Lower response rates can increase the potential for bias; however, overall estimates from state-aggregated BRFSS data are comparable to smoking estimates from national surveys with higher response rates (*10*).

Although overall cigarette smoking prevalence has declined significantly in recent years in many states, the overall use of smokeless tobacco and concurrent cigarette and smokeless tobacco has remained unchanged in most states and increased in some states. The findings in this report underscore the importance of implementing proven interventions for reducing the use of all tobacco products, including increasing the price of tobacco products, implementing comprehensive smoke-free policies and mass media campaigns, restricting tobacco advertising and promotion, controlling access to tobacco products, promoting cessation assistance for tobacco users to quit, and federal regulation of the manufacturing, distribution, and marketing of tobacco products (*3*). Evidence-based, statewide tobacco-control programs that are comprehensive, sustained, and accountable have been shown to reduce smoking rates, as well as tobacco-related diseases and deaths (*3*). However, during 2015, despite combined revenue of more than $25 billion from settlement payments and tobacco taxes for all states, states will spend only $490.4 million (1.9%) on comprehensive tobacco-control programs,[††] representing <15% of the CDC-recommended level of funding for all states combined (*3*). Full implementation of comprehensive tobacco control programs at CDC-recommended funding levels, in conjunction with the Food and Drug Administration regulation of tobacco products, could further reduce all forms of tobacco use (*3*).

[††] Additional information available at http://www.tobaccofreekids.org/content/what_we_do/state_local_issues/settlement/FY2015/2014_12_11_brokenpromises_report.pdf.

Acknowledgments

Ralph S. Caraballo, PhD, Office on Smoking and Health, CDC; Erin O'Connor, MS, DB Consulting Group, Inc.

[1]Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, CDC.

Corresponding author: Kimberly Nguyen, KNguyen2@cdc.gov, 770-488-5572.

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Notes from the Field

Hepatitis E Outbreak Among Refugees from South Sudan — Gambella, Ethiopia, April 2014–January 2015

Lauren B. Browne, MD[1,2]; Zeray Menkir, MPH[3]; Vincent Kahi, MD[4]; Gidraf Maina, MPH[4]; Solomon Asnakew, MPH[5]; Michelle Tubman, MD[5]; Hajir Z. Elyas, MD[6]; Alemayehu Nigatu, MPH[4]; David Dak, MPH[4]; U Aye Maung, MD[4]; Jolene H. Nakao, MD[2]; Oleg Bilukha, MD[2]; Cyrus Shahpar, MD[2] (Author affiliations at end of text)

In early April 2014, two South Sudanese refugees in the Gambella region of western Ethiopia experienced acute onset of jaundice, accompanied by fever. One patient was a pregnant woman aged 24 years evaluated at a routine prenatal clinic visit in Leitchour refugee camp. The second patient was a malnourished boy aged 1 year who resided in Tierkidi refugee camp. The boy died despite hospitalization. During the last 2 weeks of May, four more cases of acute jaundice syndrome (AJS), defined as yellow discoloration of the eyes, were detected in Leitchuor. By mid-June, an additional 50 AJS cases were reported across three large camps in the region, Kule, Leitchuor, and Tierkidi, with 45 (90%) of these cases reported in Leitchuor. Sera collected from a convenience sample of 21 AJS cases were sent to Addis Ababa and Nairobi for real-time polymerase chain reaction testing; 12 (57%) were positive for hepatitis E virus (HEV) RNA. By January 2015, a total of 1,117 suspected cases of hepatitis E meeting the case definition of AJS were reported among refugees in camps across Gambella.

Hepatitis E virus causes acute liver infection, which is primarily transmitted through contaminated drinking water. Outbreaks frequently occur in resource-limited countries or during humanitarian emergencies, where there is overcrowding and limited access to potable water, proper sanitation, and hygiene. The overall case fatality rate is approximately 1%, but might be as high as 20% among pregnant women in their third trimester (*1*).

Ethiopia currently hosts approximately 250,000 South Sudanese refugees, mostly women and children who fled South Sudan after civil war broke out in that country in December 2013. Most of these refugees reside in three main camps in the Gambella region: Kule, Leitchuor, and Tierkidi. As of January 2015, these camps had estimated populations of 46,000, 48,000, and 49,000, respectively. Other refugees reside in either temporary transit sites or in Pugnido camp, which was established before the beginning of the conflict in December 2013.

Data about the suspected HEV outbreak among refugees in the Gambella region were collected using a combination of passive surveillance at health care facilities and active community screening at mass food distributions and during daily household visits. From April 2014 to January 2015, a total of 1,117 suspected cases of HEV, with 21 (1.9%) deaths, were reported among refugees residing in the Gambella region. Of these, 501 (44.9%) occurred in Kule, 370 (33.1%) occurred in Leitchuor, and 211 (18.9%) occurred in Tierkidi. An additional 35 cases were documented at border entry points and transit centers in the region. Eighteen (1.6%) cases occurred among pregnant or postpartum women, two of whom died (case fatality rate = 11%).

Although peak incidence occurred during the rainy season, June–September, low levels (average = 10 reported cases/week) continued through January 2015, the last month for which data were available. Confirmatory HEV testing was not routinely available in the camps, and alternative etiologies of acute jaundice might contribute to overall case counts. However, the recent introduction of rapid immunoglobulin M antibody testing demonstrated sustained HEV transmission.

Low level transmission can precede subsequent peaks of HEV infection, as was witnessed in South Sudan in the latter part of a 2012–2013 outbreak (*2*); however, the current outbreak remains limited to date. Reasons for this have yet to be fully elucidated, but might, in part, be related to a high level of immunity among the displaced population or to improved sanitation and early detection through community screening efforts. The Ethiopian government, the United Nations High Commissioner for Refugees, and other humanitarian agencies quickly established a joint multi-sectoral response, including active AJS case detection, passive AJS surveillance, soap distribution, water quality monitoring, and outbreak response training. Further investigations to identify potential sources of ongoing, albeit low level, HEV transmission are warranted. To interrupt further transmission, community hygiene education and routine disinfection of all drinking water supplies are needed.

[1]Epidemic Intelligence Service, CDC; [2]Division of Global Health Protection, Center for Global Health, CDC; [3]Administration for Refugee and Returnee Affairs, Ethiopia; [4]United Nations High Commissioner for Refugees; [5]Médecins Sans Frontières-Operational Centre Amsterdam; [6]Médecins Sans Frontières-France.

Corresponding author: Lauren B. Browne, LBBrowne@cdc.gov, 770-488-3988.

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1. Emerson S, Purcell R. Hepatitis E virus. Rev Med Virol 2003;13:145–54.
2. CDC. Investigation of hepatitis E outbreak among refugees—Upper Nile, South Sudan, 2012–2013. MMWR Morb Mortal Wkly Rep 2013;62:581–6.

Errata

Vol. 64, No. 7

In the report, "Transmission of Hepatitis C Virus Associated with Surgical Procedures — New Jersey 2010 and Wisconsin 2011," multiple errors occurred.

On page 166, in the first paragraph, the last two sentences should be replaced with the following four sentences: "**Sequences of intrahost HCV variants sampled from these two patients clustered together in the phylogenetic tree, with some variants being shared by both patients. This cluster was distinct from clusters of intrahost HCV variants obtained from control specimens collected from other unrelated persons with HCV infection. This finding indicates that both patients were infected with the same HCV strain. Phylogenetic analysis shows that sequences from patient A form a subcluster within the cluster of sequences from patient B, which suggests that patient B was the source of transmission to patient A (Figure 1).**"

On page 167, in the third paragraph, the third sentence should read, "**CDC's quasispecies analysis showed that HCV-4 strains detected in blood specimens obtained from patients 1 and 2 shared intrahost HCV variants.**"

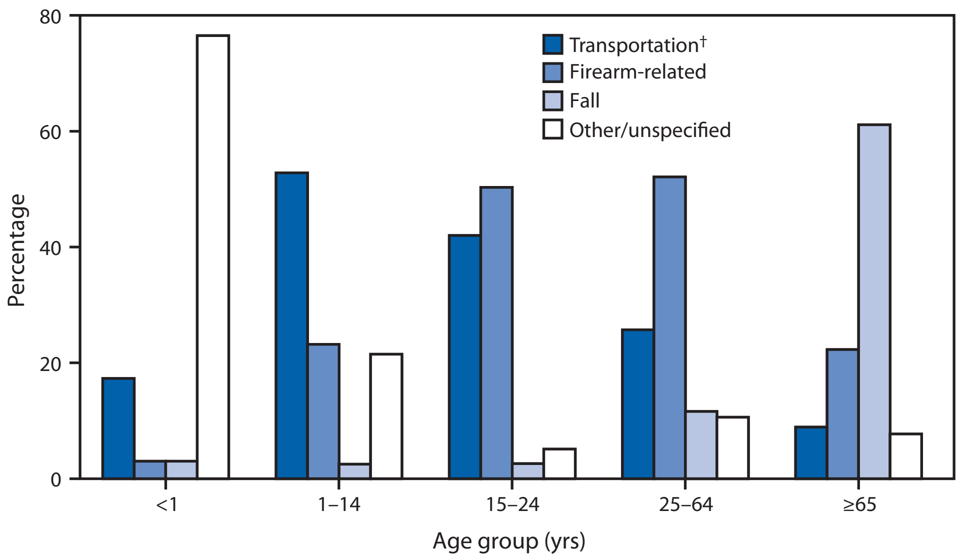
On page 168, the title for Figure 1 should read, "**FIGURE 1. Phylogenetic tree of the E1-HVR1 genomic region of hepatitis C virus (HCV) from two patients and six randomly selected unrelated controls infected with HCV genotype 1a, indicating that patient B was the likely source of patient A's infection — New Jersey, 2010.**"

On page 169, the title for Figure 2 should read, "**FIGURE 2. Phylogenetic tree of the E1-HVR1 genomic region of hepatitis C virus (HCV) from two patients and four randomly selected unrelated controls infected with HCV genotype 4, indicating that patient 2 was the likely source of patient 1's infection — Wisconsin, 2011.***"

QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Percentage of Traumatic Brain Injury (TBI)–Related Deaths,* by Underlying Cause and Age Group — United States, 2013



* TBI-related deaths were identified using the *International Classification of Diseases, Tenth Revision* underlying cause of death codes of *U01–*U03, V01–Y36, Y85–Y87, or Y89 with a multiple cause of death code of S01.0–S01.9, S02.0, S02.1, S02.3, S02.7–S02.9, S04.0, S06.0–S06.9, S07.0, S07.1, S07.8, S07.9, S09.7–S09.9, T01.0, T02.0, T04.0, T06.0, T90.1, T90.2, T90.4, T90.5, T90.8, or T90.9, for a total of 54,185 deaths in 2013 for all ages.

† Transportation includes all modes, such as motor vehicle, motorcycle, pedal cycle, pedestrian, other land transport, railway, watercraft, and aircraft.

The causes of injury that result in TBI-related deaths vary by age group. In 2013, 77% of the TBI-related deaths among infants aged <1 year were from causes other than transportation, firearms, or falls, and primarily resulted from assault and maltreatment. Transportation accounted for 53% of the TBI-related deaths among children aged 1–14 years. Firearm-related injuries accounted for 50% and 52% of the TBI-related deaths for persons aged 15–24 and 25–64 years, respectively. Most of the firearm-related TBI deaths in these two age groups were suicides (62% and 83%, respectively). The majority (61%) of TBI-related deaths for those aged ≥65 years resulted from falls.

Source: National Vital Statistics System mortality data. Available at http://www.cdc.gov/nchs/deaths.htm. Additional information on TBI available at http://www.cdc.gov/traumaticbraininjury/.

Reported by: Holly Hedegaard, MD, HHedegaard@cdc.gov, 301-458-4460.

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