Centers for Disease Control and Prevention

MMWR

Morbidity and Mortality Weekly Report

Weekly / Vol. 63 / No. 1

January 10, 2014

Lung Cancer Incidence Trends Among Men and Women — United States, 2005–2009

S. Jane Henley, MSPH[1], Thomas B. Richards, MD[1], J. Michael Underwood, PhD[1], Christie R. Eheman, PhD[1], Marcus Plescia, MD[1]; Timothy A. McAfee MD[2] (Author affiliations at end of text)

Lung cancer is the leading cause of cancer death and the second most commonly diagnosed cancer (excluding skin cancer) among men and women in the United States (*1,2*). Although lung cancer can be caused by environmental exposures, most efforts to prevent lung cancer emphasize tobacco control because 80%–90% of lung cancers are attributed to cigarette smoking and secondhand smoke (*1*). One sentinel health consequence of tobacco use is lung cancer (*1,2*), and one way to measure the impact of tobacco control is by examining trends in lung cancer incidence rates, particularly among younger adults (*3*). Changes in lung cancer rates among younger adults likely reflect recent changes in risk exposure (*3*). To assess lung cancer incidence and trends among men and women by age group, CDC used data from the National Program of Cancer Registries (NPCR) and the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) program for the period 2005–2009, the most recent data available. During the study period, lung cancer incidence decreased among men in all age groups except <35 years and decreased among women aged 35–44 years and 54–64 years. Lung cancer incidence decreased more rapidly among men than among women and more rapidly among adults aged 35–44 years than among other age groups. To further reduce lung cancer incidence in the United States, proven population-based tobacco prevention and control strategies should receive sustained attention and support (*4*).

Data on new cases of invasive lung cancer (*International Classification of Diseases for Oncology, Third Edition*: C34.0–C34.9) diagnosed during the most recent 5-year period with available data (2005–2009) were obtained from population-based cancer registries affiliated with the NPCR and SEER programs, which when combined cover the entire U.S. population. Data from all cancer registries that met the United States Cancer Statistics (USCS) data-quality criteria for each year during 2005–2009 were used in this report.*

Population denominators for incidence rates were race/ethnicity-specific and sex-specific county population estimates from the 2000 U.S. Census, as modified by SEER and aggregated to state and national levels.† Annual incidence rates per 100,000 population were age-adjusted (using 19 age groups) by the direct method to the 2000 U.S. standard population.§ Annual percentage change (APC) was used to quantify the change in incidence rates over time and was calculated using least-squares regression. Rates were considered to increase or decrease if $p<0.05$; otherwise rates were considered stable.

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

† Population estimates for 2009 incorporate bridged single-race estimates that are derived from the original multiple race categories in the 2000 U.S. Census. Additional information is available at http://seer.cancer.gov/popdata/index.html and http://www.census.gov/popest/topics/methodology.

§ Additional information available at http://seer.cancer.gov/tools/ssm.

INSIDE

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

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

The rate ratio (RR) of incidence among women to men was calculated (Table 1). Lung cancer incidence rates and trends were analyzed for men and women separately by age group for the United States and by U.S. Census region and state.

During 2005–2009, a total of 569,366 invasive lung cancer cases among men and 485,027 among women were reported in the United States (Table 1). Lung cancer incidence was highest among those aged ≥75 years and decreased with decreasing age (Figure). In all age groups except persons aged <35 years and 35–44 years, lung cancer incidence rates were higher among men than among women; this difference was greatest among those aged ≥75 years and narrowed with decreasing age (Table 1). From 2005 to 2009, lung cancer incidence decreased among men in all age groups except those aged <35 years, with an APC of -2.6% overall; among women, lung cancer incidence decreased among those aged 35–44 and 55–64 years and was stable in all other age groups yielding an APC of -1.1% overall (Table 1). Lung cancer incidence rates decreased most rapidly among adults aged 35–44 years, decreasing 6.4% per year among men and 5.9% per year among women (Table 1).

Lung cancer incidence decreased to a statistically significant extent from 2005 to 2009 among men in all U.S. Census regions and 23 states, and among women in the South and West U.S. Census regions and seven states (Table 2). By state and age group, lung cancer incidence rates decreased or were stable in most states (Table 2).

TABLE 1. Number of invasive lung cancer cases, average annual rate,* and annual percentage change (APC), by sex and age group — United States, 2005–2009

Age group (yrs)	Men No.	Men Rate	Men APC (%)	Women No.	Women Rate	RR women to men	Women APC (%)
Overall	**569,366**	**82.9**	**-2.6†**	**485,027**	**55.7**	**0.7**	**-1.1†**
<35	1,239	0.3	0.4	1,299	0.4	1.3	1.0
35–44	7,675	7.1	-6.4†	8,539	7.9	1.1	-5.9†
45–54	51,409	47.5	-2.9†	45,999	41.2	0.9	-0.1
55–64	128,474	164.4	-4.3†	100,024	118.7	0.7	-3.8†
65–74	186,161	418.8	-2.8†	152,064	289.5	0.7	-0.8
≥75	194,408	549.4	-1.7†	177,102	319.1	0.6	-0.2

Abbreviation: RR = rate ratio.
Sources: CDC's National Program of Cancer Registries and National Cancer Institute's Surveillance, Epidemiology, and End Results program.
* Per 100,000 persons, age-adjusted to the 2000 U.S. standard population.
† APC trend was significant at $p<0.05$.

Editorial Note

CDC has declared reducing tobacco use a "winnable battle"¶ and supports comprehensive efforts to prevent the initiation of tobacco use, promote quitting, and ensure smoke–free environments. This report documents recent decreases in lung cancer incidence during 2005–2009 in the United States, with lung cancer incidence declining more rapidly among men compared with

¶ Additional information available at http://www.cdc.gov/winnablebattles/tobacco/index.html.

The *MMWR* series of publications is published by the Center for Surveillance, Epidemiology, and Laboratory Services, Centers for Disease Control and Prevention (CDC), U.S. Department of Health and Human Services, Atlanta, GA 30333.
Suggested citation: Centers for Disease Control and Prevention. [Article title]. MMWR 2014;63:[inclusive page numbers].

women in all age groups except age <35 years. Since 1964 when the first Surgeon General's report on the health consequences of smoking was published, cigarette smoking cessation rates increased and cigarette smoking initiation rates decreased more rapidly among men than women (*5*). As a result, cigarette smoking behaviors have become more similar among men and women, especially among those in recent birth cohorts (*5*). Subsequently, the gap in lung cancer between men and women has been reported to be diminishing (*6*). This report shows that differences in lung cancer incidence between men and women narrowed with decreasing age, and that among adults aged <45 years, men had slightly lower rates of lung cancer than women.

Another finding is that lung cancer incidence decreased most rapidly from 2005 to 2009 among men and women aged 35–44 years compared with other age groups. Although many factors might have contributed to this decline, a study of 44 states showed that strong tobacco control indicators were correlated with lower lung cancer incidence rates among adults age 20–44 years (*7*). Whereas a coordinated, multicomponent approach to tobacco prevention and control is needed to reduce tobacco use, younger adults might be more sensitive than older

What is already known on this topic?

Because of shifts in cigarette smoking prevalence, the gap between men and women in lung cancer incidence is diminishing, particularly among younger adults.

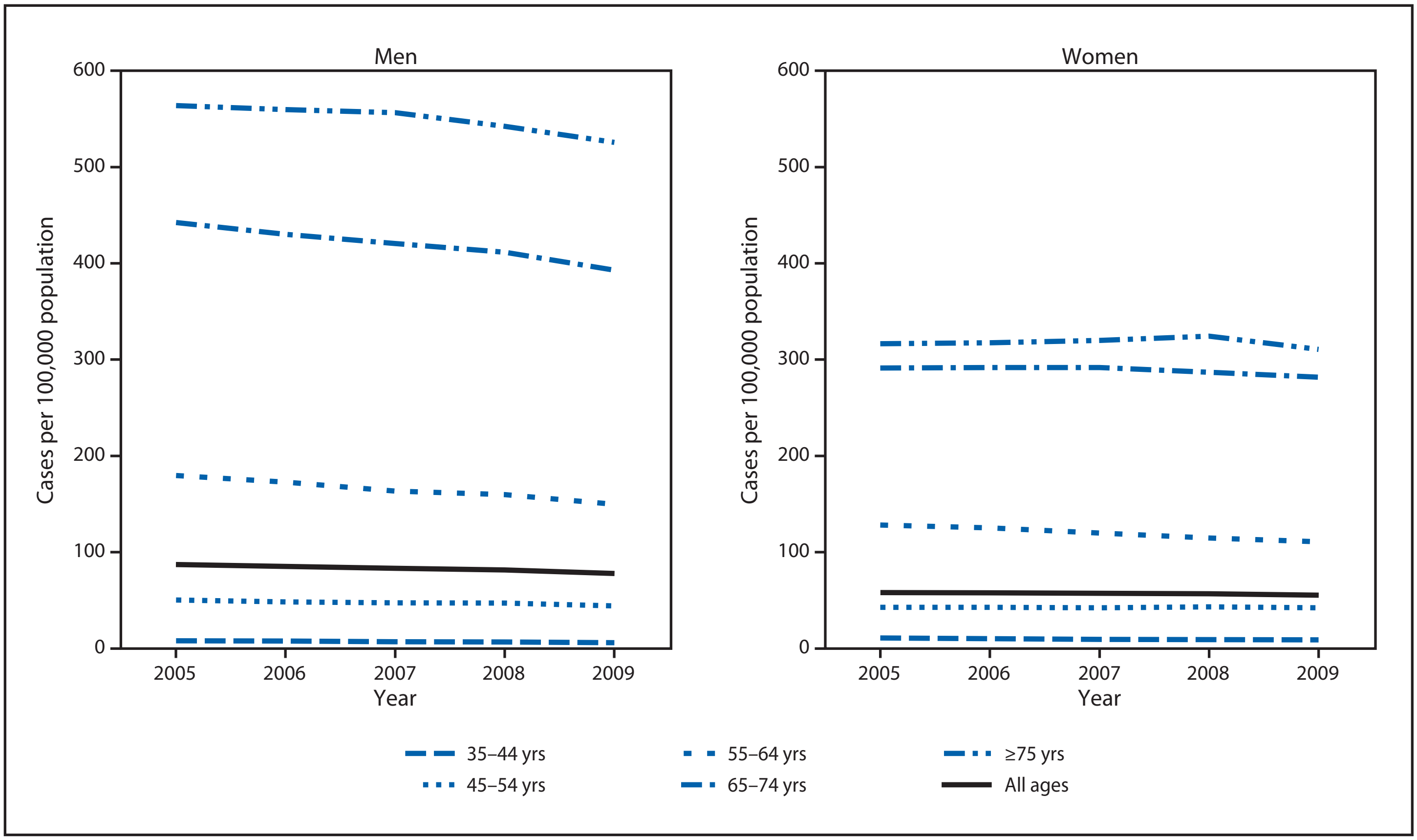
What is added by this report?

From 2005 to 2009, lung cancer incidence rates decreased among men and women in the United States overall, among men in 23 states, and among women in seven states. Lung cancer incidence rates during 2005–2009 decreased more rapidly among men than among women and more rapidly among adults aged 35–44 years than among other age groups. As a result, differences in lung cancer incidence between men and women narrowed with decreasing age; among adults aged 35–44 years, men had slightly lower rates of lung cancer than did women.

What are the implications for public health practice?

Although lung cancer incidence is decreasing overall, it is not decreasing at the same pace among men and women, nor in all age groups, and it is not decreasing in all states. Continued attention to local, state, and national population-based tobacco prevention and control strategies are needed to achieve further reductions in tobacco use among men and women of all ages to reduce lung cancer in the United States.

FIGURE. Rate* of invasive lung cancer cases among men and women, by age group — United States, 2005–2009



Sources: CDC's National Program of Cancer Registries and National Cancer Institute's Surveillance, Epidemiology, and End Results program.
* Lung cancer incidence per 100,000.

TABLE 2. Annual percentage change (APC) in invasive lung cancer incidence, by sex, age group (yrs), U.S. Census region, and state — United States, 2005–2009

	Men						Women					
Region/State	All ages APC (%)	35–44 APC (%)	45–54 APC (%)	55–64 APC (%)	65–74 APC (%)	≥75 APC (%)	All ages APC (%)	35–44 APC (%)	45–54 APC (%)	55–64 APC (%)	65–74 APC (%)	≥75 APC (%)
United States	**-2.6***	**-6.5***	**-2.9***	**-4.3***	**-2.7***	**-1.7***	**-1.1***	**-5.8***	**-0.1**	**-3.7***	**-0.8**	**-0.1**
Northeast	-2.1*	-3.7	-3.1*	-4.6*	-2.2*	-0.9	-0.5	-6.1*	-0.1	-2.9*	-0.3	0.9
Connecticut	-1.5	—[†]	-3.5	-2.8	-3.0	0.3	-0.9	—	-1.9	-4.0	-1.2	1.4
Maine	-2.3	—	0.1	-4.6	-1.3	-3.2	0.4	—	6.9	-3.6	0.8	0.2
Massachusetts	-3.6*	-6.9	0.4	-6.1*	-3.8	-3.0*	-1.4	-0.3	1.2	-4.5	-0.8	-1.1
New Hampshire	-2.8	—	2.7	-7.2*	-2.6	-2.2	-2.8	—	-1.6	-6.6*	-4.2	0.9
New Jersey	-3.3*	-4.6	-7.1*	-4.5*	-3.5	-2.1*	-1.3	-11.1*	-2.0	-3.5*	-0.5	0.0
New York	-1.0	-5.9*	-3.5*	-3.7*	-1.1	0.9	0.0	-6.3*	-0.4	-3.2*	-0.1	2.5
Pennsylvania	-2.3*	-0.8	-3.4*	-5.2*	-1.7	-1.4	-0.1	-6.0	0.7	-1.1	0.2	0.5
Rhode Island	-1.6	—	3.8	-4.3	-2.9	0.3	1.0	—	-1.1	-1.1	1.8	2.6
Vermont	-3.0	—	-3.4	-7.7	-5.0	0.4	-1.0	—	3.7	1.4	-2.3	0.0
Midwest	-2.9*	-4.2*	-2.0	-4.2*	-3.0*	-2.3*	-0.8	-4.5*	1.8	-3.9*	-0.6	0.2
Illinois	-1.9*	-6.1	-3.3	-3.8*	-2.1	-0.6	0.6	-6.8*	2.1*	-3.2*	1.5*	1.5
Indiana	-2.3	-3.0	-1.6	-1.3	-3.3	-2.1	-0.9	-2.0	1.2	-2.7	-0.4	-1.0
Iowa	-2.2	—	1.1	-4.8	-0.8	-3.1*	0.1	—	4.4	-2.5	0.5	-0.2
Kansas	-3.1	—	1.8	-2.7	-1.3	-5.8	-0.5	—	3.6	-6.5*	-1.5	3.7
Michigan	-3.2*	-5.8	-2.0	-2.9*	-4.2*	-2.7	-2.4	-11.1*	-2.1	-4.4	-2.1	-1.3
Minnesota	-1.6	-7.7	0.5	-5.5	-0.4	-1.2	1.0	-2.8	2.9	-3.3	1.7	2.6
Missouri	-3.5*	-4.4	-2.5	-5.8*	-4.8*	-1.5	-1.1	1.2	4.8	-2.8	-2.5	-0.8
Nebraska	-4.6*	—	3.3	-7.3	-6.6	-2.3	-0.8	—	15.6	-8.5	-0.2	-0.9
North Dakota	-4.6*	—	—	-9.9	-5.9	-3.3	-1.7	—	—	-3.4	-1.7	4.8
Ohio	-3.4*	-2.3	-3.7	-5.0*	-3.0	-3.2*	-1.2*	-3.1	1.9*	-4.0	-1.2*	-0.5
South Dakota	-5.0	—	-0.7	-5.9*	0.0	-8.3	-2.5*	—	—	-16.6*	-2.0	3.8
South	-2.8*	-9.4*	-2.8*	-4.1*	-2.5*	-2.1*	-1.3*	-6.7*	-0.2	-3.7*	-0.6	-0.6
Alabama	-0.3	-13.5*	-0.1	0.3	-1.9	1.5	0.3	-3.6	-1.4	-0.6	0.5	1.6
Arkansas	-2.9	—	-0.1	-5.2*	-1.0	-3.3	-1.5	—	0.0	-6.5*	0.3	0.2
Delaware	-3.6*	—	-3.4	-7.4*	-3.7	-2.5	-5.9*	—	0.6	-15.5*	-2.7	-4.3
District of Columbia	-2.1*	—	-0.1	-1.6	-1.4	-3.0	-2.4	—	—	-3.4	-0.9	4.4
Florida	-3.3*	-8.2*	-4.9*	-5.1*	-2.6*	-2.4*	-1.5*	-5.4	-3.1	-3.7*	-0.1	-0.8
Georgia	-2.0*	-4.6	-2.4	-3.6*	-2.2	-0.9	0.0	-7.8	0.1	-1.5	1.6	-0.3
Kentucky	-1.6	-12.9	2.2	-2.8*	-1.5	-1.3	-0.1	0.2	2.8*	-1.0	-0.9	0.5
Louisiana	-2.8	-2.3	-1.6	-3.5	-1.6	-3.7	-1.0	-8.4	-0.4	-2.2	-1.6	0.7
Maryland	-4.6	-14.9	-3.1	-3.7	-7.4*	-2.7	-2.2	-17.5*	-2.5	-5.6*	-1.7	-0.1
Mississippi	0.9	-8.7	-2.1	-0.7	-0.5	4.5	1.0	—	1.0	-5.4	3.4	3.8
North Carolina	-2.7*	-11.3*	-3.2	-3.0*	-1.1	-3.4*	-0.9	-2.1	0.4	-4.3*	0.6	-0.8
Oklahoma	-2.4	—	0.4	-4.7	-0.8	-2.3	-2.0	—	-0.4	-8.3*	0.5	-1.2*
South Carolina	-3.8*	-7.1	-4.0*	-4.8*	-3.3	-3.6	-2.2	-13.6	3.8*	-4.7*	-2.1	-1.9
Tennessee	-2.9*	-2.3	-1.3	-3.6*	-3.8*	-2.2	0.1	-6.5	1.5	-2.0	0.0	1.9
Texas	-3.5*	-10.1*	-5.3	-6.0*	-2.4	-2.9*	-2.4*	-7.8	0.2	-3.7*	-2.9*	-1.6
Virginia	-2.6*	-8.1	-2.4*	-3.8*	-3.8*	-0.9	-1.1	-4.2	0.6	-4.3	-0.5	-0.4
West Virginia	-3.6*	—	-2.1	-4.5	-3.6	-3.7*	-2.6	—	5.1*	-2.2	-3.1	-5.4
West	-2.6*	-4.4*	-4.4*	-4.5*	-3.5*	-0.9	-1.8*	-4.2	-2.5*	-4.0*	-1.7	-0.7
Alaska	-0.5	—	-0.2	-3.7	-6.4	6.4*	-7.2	—	1.6	-3.6	-6.7	-12.0
Arizona	-1.7	—	-7.6*	-4.4	-1.8	0.9	-1.4	4.0	-3.6	-5.4*	-0.6	0.1
California	-2.7*	-5.7	-5.2*	-4.6*	-4.1*	-0.8	-1.8	-1.9	-5.2*	-4.2*	-1.7	-0.4
Colorado	-0.1	—	-2.2	-1.0	-0.6	0.9	-0.1	—	4.3	-2.7	0.5	0.3
Hawaii	-1.9	—	-6.8	-6.0	-2.2	1.3	-1.8	—	-7.9	3.2	-5.7	1.1
Idaho	-3.8	—	6.9	-3.7	-4.3	-4.3	-3.6	—	-3.3	-7.7	-2.7	-1.2
Montana	-3.8*	—	-3.3	0.4	-7.6*	-3.0	-3.8*	—	-5.7	-8.3	-0.7	-4.8
Nevada	-3.5	—	-6.4	-5.2*	-4.1	-2.2	-1.7	—	-1.0	-1.6	1.7	-4.2*
New Mexico	-4.2*	—	-4.3	-9.9	-3.2	-3.0	-0.2	—	12.3*	-2.9	-2.5	-0.2
Oregon	-4.0*	—	-5.9	-4.1	-3.2	-4.3*	-2.0*	—	2.2	-4.4*	-3.7	-0.1
Utah	-2.2	—	-1.6	-9.6	1.7	-2.5	-4.4	—	—	1.0	-8.5	-4.7
Washington	-2.3	-3.8	-0.6	-4.0	-4.8	0.0	-2.1	-5.1	-1.2	-4.0*	-2.4	-1.1
Wyoming	2.3	—	—	-4.8	1.8	6.5	-3.6	—	—	-13.8	-4.6	1.7

Sources: CDC's National Program of Cancer Registries and National Cancer Institute's Surveillance, Epidemiology, and End Results program.
* APC trend was significant at $p<0.05$.
[†] APC is not presented for groups with <16 cases in any year. Data for Wisconsin were suppressed at the state's request.

adults to certain interventions like increased tobacco prices. A systematic review of tobacco control interventions found that for every 10% increase in cigarette prices, cigarette smoking prevalence decreased 1%–14% among youth compared with 1%–4.5% among adults (*8*). In 2010, a higher proportion of adults aged 18–24 years attempted to quit smoking cigarette and succeeded in quitting than adults aged 45–64 years (*9*). Other population-based strategies proven to reduce tobacco use among youths and adults include comprehensive smoke-free laws, restriction of tobacco advertising and promotion, and mass media campaigns (*4,8*). These strategies are effective in changing the cigarette smoking behavior of both men and women, and can be combined with individual-based strategies such as providing access to telephone quitlines and health-care coverage for tobacco cessation treatments (*4,8*). Additionally, strategies for tobacco control have expanded now that the Food and Drug Administration has been granted the authority to regulate the manufacture, distribution, and marketing of tobacco products.**

In 2007, CDC updated recommendations regarding the estimated minimum level of funding needed to implement and sustain statewide comprehensive tobacco control programs; the combined recommended amount across programs was $3.7 billion.†† In contrast, in 2010, states appropriated only $0.64 billion, amounting to 2.4% of their state tobacco revenues, for tobacco control (*10*). A previous report showed that states varied substantially in their success at reducing cigarette smoking prevalence and lung cancer incidence (*2*). This report shows that lung cancer incidence decreased during 2005–2009 among men in all U.S. Census regions and 23 states, and decreased among women in the South and West and seven states; lung cancer incidence rates were stable in all other states. Another finding is that lung cancer incidence rates during 2005–2009 stabilized among women aged 45–54 years. This age group includes women born during 1950–1960 who were young adults during an era in which cigarettes were aggressively marketed toward women (*1*). This generation experienced a high prevalence of cigarette smoking as young women and high rates of lung cancer mortality as older women (*1*).

The findings in this report are subject to at least four limitations. First, populations were estimated from the 2000 Census by the U.S. Census Bureau; errors in these estimates might increase as time passes after the census, leading to underestimates or overestimates of incidence rates. Second, analyses based on race and ethnicity might be biased if race and ethnicity were misclassified; efforts were made to ensure that this information was as accurate as possible.§§ Third, delays in cancer reporting might result in an underestimate of the incidence rate. Fourth, analyses of trends should be carefully interpreted; some rates might be actually increasing or decreasing although the trend is not statistically significant..

From 2005 to 2009 lung cancer incidence rates decreased among men and women in the United States overall, more rapidly among men than among women, and more rapidly among adults aged 35–44 years than among other age groups. As a result, differences in lung cancer incidence between men and women narrowed with decreasing age. However, continued attention and support to proven population-based tobacco prevention and control strategies will be needed to reduce tobacco use among both men and women and further reduce lung cancer in the United States (*4*).

** Additional information available at http://www.fda.gov/tobaccoproducts/guidancecomplianceregulatoryinformation/ucm246129.htm.

†† Additional information available at http://www.cdc.gov/tobacco/stateandcommunity/best_practices/index.htm.

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

Acknowledgment

State and regional cancer registry staff members.

[1]Div of Cancer Prevention and Control; [2]Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, CDC (Corresponding author: S. Jane Henley, shenley@cdc.gov, 770-488-4157).

References

1. Jemal A, Thun MJ, Ries LAG, et al. Annual report to the nation on the status of cancer, 1975–2005, featuring trends in lung cancer, tobacco use, and tobacco control. J Natl Cancer Inst 2008;100:1672–94.
2. CDC. State-specific trends in lung cancer incidence and smoking—United States, 1999–2008. MMWR 2011;60:1243–7.
3. Jemal A, Cokkinides VE, Shafey O, Thun MJ. Lung cancer trends in young adults: an early indicator of progress in tobacco control (United States). Cancer Causes Control 2003;14:579-85.
4. Institute of Medicine. Reducing tobacco-related cancer incidence and mortality: workshop summary. Washington, DC: The National Academies Press; 2013. Available at http://iom.edu/reports/2012/reducing-tobacco-related-cancer-incidence-and-mortality.aspx.
5. Anderson CM, Burns DM, Dodd KW, Feuer EJ. Chapter 2: birth-cohort-specific estimates of smoking behaviors for the U.S. population. Risk Anal 2012;32(Suppl 1):S14–24.
6. Thun MJ, Carter BD, Feskanich D, et al. 50-year trends in smoking-related mortality in the United States. N Engl J Med 2013;368:351–64.
7. Polednak AP. Tobacco control indicators and lung cancer rates in young adults by state in the United States. Tob Control 2008;17:66–9.
8. Wilson LM, Avila Tang E, Chander G, et al. Impact of tobacco control interventions on smoking initiation, cessation, and prevalence: a systematic review. J Environ Public Health 2012; June 7, 2012. Epub.
9. CDC. Quitting smoking among adults—United States, 2001–2010. MMWR 2011;60:1513–9.
10. CDC. State tobacco revenues compared with tobacco control appropriations—United States, 1998–2010. MMWR 2012;61:370–4.

Recreational Water–Associated Disease Outbreaks — United States, 2009–2010

Michele C. Hlavsa, MPH[1], Virginia A. Roberts, MSPH[1], Amy M. Kahler, MS[1], Elizabeth D. Hilborn, DVM[2], Timothy J. Wade, PhD[2], Lorraine C. Backer, PhD[3], Jonathan S. Yoder, MPH[1] (Author affiliations at end of text)

Recreational water–associated disease outbreaks result from exposure to infectious pathogens or chemical agents in treated recreational water venues (e.g., pools and hot tubs or spas) or untreated recreational water venues (e.g., lakes and oceans). For 2009–2010, the most recent years for which finalized data are available, public health officials from 28 states and Puerto Rico electronically reported 81 recreational water–associated disease outbreaks to CDC's Waterborne Disease and Outbreak Surveillance System (WBDOSS) via the National Outbreak Reporting System (NORS). This report summarizes the characteristics of those outbreaks. Among the 57 outbreaks associated with treated recreational water, 24 (42%) were caused by *Cryptosporidium*. Among the 24 outbreaks associated with untreated recreational water, 11 (46%) were confirmed or suspected to have been caused by cyanobacterial toxins. In total, the 81 outbreaks resulted in at least 1,326 cases of illness and 62 hospitalizations; no deaths were reported. Laboratory and environmental data, in addition to epidemiologic data, can be used to direct and optimize the prevention and control of recreational water–associated disease outbreaks.

CDC defines a recreational water–associated disease outbreak as the occurrence of similar illnesses in two or more persons epidemiologically linked by location and time of exposure to recreational water or water-associated chemicals volatilized into the air surrounding the water. Public health officials in U.S. states, the District of Columbia, U.S. territories, and Freely Associated States* voluntarily report outbreaks of recreational water–associated illness to CDC. This report summarizes data on recreational water–associated disease outbreaks electronically reported to CDC's WBDOSS via NORS† by October 3, 2012, in which the earliest illness onset date occurred during 2009–2010. Data requested for each outbreak include the number of cases,§ hospitalizations, and deaths; illness type; etiology; the venue (e.g., hot tub or spa) and setting (e.g., hotel) at which the outbreak exposure occurred; and earliest illness onset date. Additionally, 10 states received CDC funding to conduct enhanced surveillance for human and animal illnesses and deaths associated with exposure to cyanobacterial toxins¶; outbreaks identified by these surveillance efforts were also voluntarily reported to NORS. Negative binomial regression analyses were conducted to assess for trends in incidence. All outbreaks were classified according to the strength of data implicating recreational water as the outbreak vehicle, as described elsewhere (*1*).** Classification does not necessarily assess adequacy or completeness of investigations.††

For 2009–2010, public health officials from 28 states and Puerto Rico reported 81 recreational water–associated disease outbreaks (http://www.cdc.gov/healthywater/surveillance/recreational/tables.html) (Figure 1). The number of outbreaks reported for a given year (range: 6–84 outbreaks) has significantly increased ($p<0.001$) since 1978, the year national reporting of recreational water–associated disease outbreaks began (Figure 2). The 1,326 outbreak-related cases reported for 2009–2010 resulted in at least 62 (5%) hospitalizations; no outbreak-related deaths were reported. Etiology was confirmed for 49 (60%) outbreaks, of which 27 (55%) were caused by *Cryptosporidium* (Table). Since 1988, the year the first U.S. treated recreational water–associated outbreak of cryptosporidiosis was detected, the number of these outbreaks reported for a given year (range: 0–40 outbreaks) has significantly increased ($p<0.001$) and has, at least in part, driven the significant increase in the overall number of recreational water–associated disease outbreaks reported for a given year ($p<0.001$) (Figure 2). Based on data reported to CDC, 32 (40%) of the 81 outbreaks were categorized as class IV, "epidemiologic and clinical laboratory data provided but limited, and environmental data not provided or inadequate."

Of the 81 outbreaks during 2009–2010, 57 (70%) were associated with treated recreational water. These outbreaks resulted in at least 1,030 cases (78% of all outbreak-related

* Includes Marshall Islands, Federated States of Micronesia, and Republic of Palau; formerly part of the U.S.-administered Trust Territory of the Pacific Islands.

† The reporting form and guidance for reporting via NORS are available at http://www.cdc.gov/nors. Disease outbreaks resulting from recreational water exposures on cruise ships are not reported to WBDOSS.

§ For this report, case counts were based on the estimated number of total cases; reporting public health agencies were not asked to provide supporting evidence for estimates as they were for estimates in the previous report (*1*).

¶ Harmful Algal Bloom-Related Illness Surveillance System activities were supported through the Cooperative Agreement to Enhance Surveillance of Risk Factors and Health Effects Related to Harmful Algal Blooms (CDC-RFA-EH08-801).

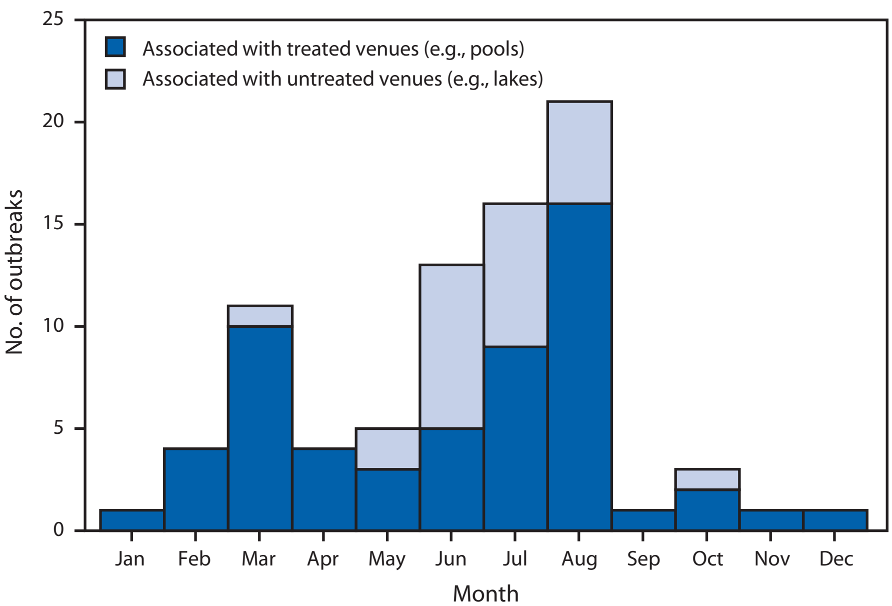
** Ranging from class I (provided adequate epidemiologic, clinical laboratory, and environmental data) to class IV (epidemiologic and clinical laboratory data provided but limited, and environmental data not provided or inadequate).

†† Outbreaks and subsequent investigations occur under different circumstances, and not all outbreaks can be investigated vigorously. Multiple factors (e.g., timeliness of outbreak detection) contribute to the ability to collect and report optimal epidemiologic, clinical laboratory, and environmental data.

cases) and 40 (65%) hospitalizations. The median number of cases reported for these outbreaks was seven (range: 2–280 cases). The outbreaks had a bimodal temporal distribution (Figure 1). Of the 25 (44%) outbreaks that started in July or August, 23 (92%) were of acute gastrointestinal illness, and 21 (84%) were caused by *Cryptosporidium*. Ten (18%) outbreaks started in March; five (50%) were of an unidentified etiology but were suspected to have been caused by pool chemicals or disinfection by-products. Over half of the 57 outbreaks were associated with hotel (19 [33%]) or waterpark (14 [25%]) settings. Outbreaks associated with the hotel setting most frequently started in February, March, or April (11 [58%]); were outbreaks of dermatologic illnesses, conditions, or symptoms confirmed or suspected to have been caused by *Pseudomonas aeruginosa* (nine [47%]); and were epidemiologically linked, at least in part, to a hot tub or spa (11 [58%]).

Of the 81 outbreaks during 2009–2010, 24 (30%) were associated with untreated recreational water. These outbreaks resulted in at least 296 cases (22% of all outbreak-related cases) and 22 (35%) hospitalizations. The median number of cases reported for these outbreaks was 5.5 (range: 2–69 cases). Of these outbreaks, 23 (96%) were associated with fresh water; 20 (83%) started in June, July, or August; and 11 (46%) were confirmed or suspected to have been caused by cyanobacterial toxins. A more detailed description of data on outbreaks at least suspected to have been caused by cyanobacterial toxins is separately presented in this issue of *MMWR*.

FIGURE 1. Number of waterborne disease outbreaks associated with recreational water (n = 81), by month — United States, 2009–2010

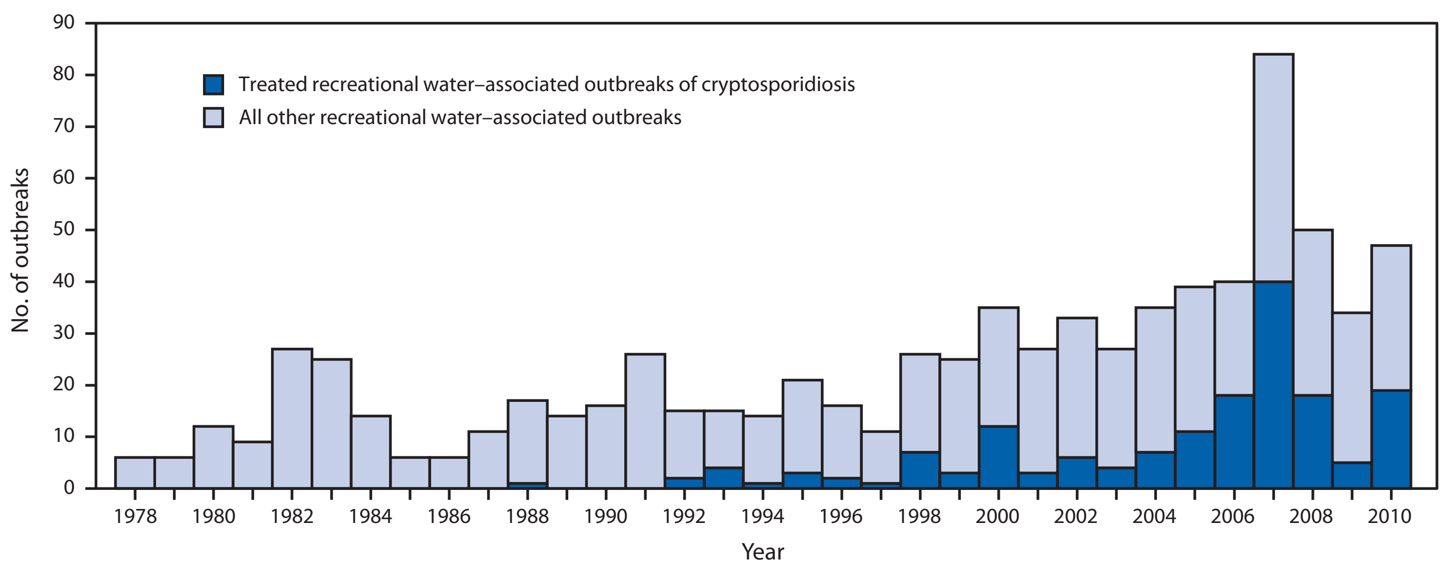


Source: CDC's Waterborne Disease and Outbreak Surveillance System, as reported via the National Outbreak Reporting System.

Editorial Note

The reporting of all waterborne disease outbreaks to CDC transitioned from paper-based to electronic, starting in 2009. The 2009–2010 counts of 81 outbreaks and 1,326 total cases are less than the 134 outbreaks and 13,966 cases (55% of which were associated with two communitywide outbreaks) (*1–3*), reported for 2007–2008. Thus, the 2009–2010 data

FIGURE 2. Number of waterborne disease outbreaks associated with recreational water (n = 789), by year — United States, 1978–2010



Source: CDC's Waterborne Disease and Outbreak Surveillance System, as reported via the National Outbreak Reporting System.

TABLE. Number of waterborne disease outbreaks associated with recreational water (n = 81), by etiology and type of water exposure — United States, 2009–2010

	Type of water exposure								
	Treated			Untreated			Total		
Etiology	Outbreaks	Cases*	Hospitalized	Outbreaks	Cases*	Hospitalized	Outbreaks (%)†	Cases* (%)	Hospitalized (%)
Bacterium	**10**	**75**	**11**	**5**	**91**	**18**	**15 (19)**	**166 (13)**	**29 (47)**
Campylobacter jejuni	0	0	0	1	6	4	**1**	**6**	**4**
Escherichia coli O157:H7	1	14	4	3	17	8	**4**	**31**	**12**
Legionella spp.	4	8	7	0	0	0	**4**	**8**	**7**
Pseudomonas aeruginosa	4	50	0	0	0	0	**4**	**50**	**0**
Shigella sonnei	1	3	0	1	68	6	**2**	**71**	**6**
Parasite	**25**	**413**	**15**	**3**	**16**	**0**	**28 (35)**	**429 (32)**	**15 (24)**
Cryptosporidium spp.	24	406	14	3	16	0	**27**	**422**	**14**
Giardia intestinalis	1	7	1	0	0	0	**1**	**7**	**1**
Virus	**0**	**0**	**0**	**1**	**69**	**2**	**1 (1)**	**69 (5)**	**2 (3)**
Norovirus	0	0	0	1	69	2	**1**	**69**	**2**
Chemical	**0**	**0**	**0**	**4**	**38**	**1**	**4 (5)**	**38 (3)**	**1 (2)**
Cyanobacterial toxin(s)§	0	0	0	4	38	1	**4**	**38**	**1**
Multiple¶	**0**	**0**	**0**	**1**	**45**	**0**	**1 (1)**	**45 (3)**	**0 (0)**
Campylobacter jejuni, norovirus genogroup I, *Shigella* sp.	0	0	0	1	45	0	**1**	**45**	**0**
Unidentified	**22**	**542**	**14**	**10**	**37**	**1**	**32 (40)**	**579 (44)**	**15 (24)**
Suspected avian schistosomes	0	0	0	2	11	0	**2**	**11**	**0**
Suspected chemical exposure**	8	54	1	0	0	0	**8**	**54**	**1**
Suspected chloramines**	2	311	0	0	0	0	**2**	**311**	**0**
Suspected algaecide (copper)	0	0	0	1	3	0	**1**	**3**	**0**
Suspected cyanobacterial toxin(s)§	0	0	0	7	23	1	**7**	**23**	**1**
Suspected norovirus	2	91	13	0	0	0	**2**	**91**	**13**
Suspected *P. aeruginosa*	5	55	0	0	0	0	**5**	**55**	**0**
Unidentified	5	31	0	0	0	0	**5**	**31**	**0**
Total (%)	**57 (70)**	**1,030 (78)**	**40 (65)**	**24 (30)**	**296 (22)**	**22 (35)**	**81 (100)**	**1,326 (100)**	**62 (100)**

Source: CDC's Waterborne Disease and Outbreak Surveillance System, as reported via the National Outbreak Reporting System.

* No deaths were reported among cases associated with these outbreaks.

† Percentages do not add up to 100% because of rounding.

§ Confirmed or suspected cyanobacterial toxin etiologies were determined on the basis of symptom and environmental data. Microcystin was considered a confirmed etiology if water testing detected ≥20 parts μg/mL microcystin toxin in water samples collected during or within 1 day of the outbreak exposure period. Microcystin was considered a suspected etiology if water testing detected <20 μg/mL microcystin toxin in water samples collected during or within 1 day of the outbreak exposure period. All other algal toxins (e.g., saxitoxin) measured in water samples collected during or within 1 day of the outbreak exposure period were considered suspected etiologies, regardless of the toxin level. A general etiology of "cyanobacterial toxin(s)" was considered to be a suspected etiology if environmental data were insufficient to identify specific toxins or if rash was a predominant illness in an outbreak for which confirmed or suspected etiologies are not well known to cause rash (i.e., to acknowledge the potential for illness caused by undetected mixed algal blooms, exotoxins, or endotoxins).

¶ Outbreaks with multiple etiologies are defined as outbreaks in which more than one type of etiologic agent (e.g., bacterium or virus) is detected in specimens from affected persons. Clinical test results are currently reported at the person level (e.g., five of 10 persons tested positive for *Cryptosporidium*) in the National Outbreak Reporting System. Clinical test results were historically reported to CDC at the clinical specimen level (e.g., five of 10 stool specimens tested positive for *Cryptosporidium*). Multiple etiologies were assigned when each etiologic agent was found in ≥5% of positive clinical specimens. Therefore, multiple etiology assignments presented in this report might not be directly comparable with previously published data.

** Etiology unidentified: disinfection by-products (e.g., chloramines), altered water chemistry, or extremely elevated chlorine levels suspected based on reported data.

represent a 40% and 91% decrease in the number of reported outbreaks and outbreak-related cases, respectively. The number of outbreaks reported for 2007–2008 might be an outlier because a possible 2007 multistate treated recreational water–associated outbreak of cryptosporidiosis was counted as multiple separate outbreaks in adjacent states (*1*). With no more than 126 cases reported for any given 2009–2010 recreational water–associated outbreak of cryptosporidiosis, perhaps state and local public health officials are proactively instituting prevention and control measures and thus preventing or minimizing communitywide cryptosporidiosis outbreaks (*4*). However, without systematic molecular typing of *Cryptosporidium* isolates, it is difficult to determine if identified outbreaks are independent or related events.

The Model Aquatic Health Code (MAHC) is a set of science-based and best-practice guidelines designed to reduce risk for illness and injury at public treated recreational–water venues (http://www.cdc.gov/mahc). Thus, the MAHC represents an opportunity to prevent and control outbreaks through recommendations such as additional water treatment (e.g., ultraviolet light or ozone) to inactivate extremely chlorine-tolerant *Cryptosporidium* oocysts at venues where WBDOSS data indicate there is increased risk for transmission. In the United States, codes regulating public treated recreational–water venues are independently written and enforced by state or local agencies; the consequent variation in the codes has been identified as a barrier to preventing and controlling outbreaks associated with these venues. Since 2007, CDC, the New York State Department of Health, and many other stakeholders have spearheaded the development of the MAHC. The MAHC will be available for the second and final round of public comment in early 2014; the first official edition is expected to be released in the summer of 2014.

Eutrophication[§§] of natural waters can potentially lead to harmful algal blooms (HABs), which naturally release cyanobacterial toxins. Illness caused by cyanobacterial toxins is nonspecific and probably underrecognized; thus, its epidemiology is not well understood and warrants further investigation. No U.S. federal regulations or public health guidelines specify allowed concentrations of cyanobacterial toxins in the water; however, some U.S. states have developed their own guidelines (*5,6*). The economic losses associated with HABs are substantial. A study of the economic impact of *Karenia brevis*, a harmful marine alga, in one Florida county during 2001–2006 estimated the cost of emergency department treatment of bloom-associated respiratory illness to range from $500,000 to $4 million (*7*). Closing or not using U.S. freshwater lakes for recreational activities because of hypereutrophication (i.e., HABs) is estimated to cost $0.37–1.16 billion per year (*8*).

The findings in this report are subject to at least two limitations. First, the outbreak counts presented are likely an underestimate of actual incidence. Factors such as 1) limited illness severity, 2) small outbreak size, 3) long incubation period of illness, 4) wide geographic dispersion of ill swimmers, 5) transient nature of contamination, 6) setting or venue of outbreak exposure (e.g., residential backyard pool), and 7) potential lack of communication between those who respond to outbreaks of chemical etiology (e.g., hazardous materials personnel) and those who usually report outbreaks (e.g., infectious disease epidemiologists) can be barriers to the detection, investigation, and reporting of outbreaks. Second, the jurisdictions reporting outbreaks most frequently might not be the jurisdictions in which the outbreaks most frequently occur, because public health capacity and notification requirements for diseases and outbreaks vary across jurisdictions.

The transition from paper-based to electronic reporting of national waterborne disease outbreak surveillance data represents an opportunity to optimize the quality and completeness of epidemiologic, clinical laboratory, and environmental data reported for individual outbreaks. CDC is working to 1) collaboratively identify, with state partners, NORS reporting issues and address them, 2) expand systematic molecular typing of *Cryptosporidium* isolates nationally (http://www.cdc.gov/parasites/crypto/cryptonet.html), 3) develop tools to collect environmental data during inspections of venues implicated in outbreak investigations, and 4) provide funding to state partners to support enhanced surveillance of waterborne disease. Additionally, establishing a national surveillance system that collects state and local environmental data on routine inspection of public treated recreational–water venues can be used to assess code compliance and highlight where violations are disproportionately high (*9*). Combining these data and data from systematic molecular typing of *Cryptosporidium* isolates with NORS data could synergistically direct and optimize prevention and control of recreational water–associated disease outbreaks.

[§§] High concentrations of nutrients stimulate plant growth. Eutrophication is associated with widely varying concentration of dissolved oxygen, algal blooms, and a decline in aquatic animal life.

What is already known on this topic?

Recreational water–associated disease outbreaks continue to occur throughout the United States. CDC collects data on waterborne disease outbreaks electronically submitted by states, the District of Columbia, U.S. territories, and Freely Associated States to CDC's Waterborne Disease and Outbreak Surveillance System via the National Outbreak Reporting System.

What is added by this report?

For 2009–2010, a total of 81 recreational water–associated disease outbreaks were reported to CDC. Of the 1,326 reported outbreak-related cases, 62 resulted in hospitalization; no deaths were reported. Almost a third (30%) of the outbreaks were caused by *Cryptosporidium* and associated with treated recreational water venues (e.g., pools). Of 24 outbreaks associated with untreated recreational water venues (e.g., lakes), almost half (46%) were confirmed or suspected to have been caused by cyanobacterial toxins.

What are the implications for public health practice?

Guidance to prevent and control recreational water–associated disease outbreaks, such as the Model Aquatic Health Code, can be optimized when directed by national outbreak data as well as laboratory data (e.g., molecular typing of *Cryptosporidium*) and environmental data (i.e., inspection data).

Acknowledgments

State, territorial, local, and Freely Associated State waterborne disease coordinators, epidemiologists, and environmental health personnel; Sarah A. Collier, MPH, LaTonia C. Richardson, MS, Div of Foodborne, Waterborne, and Environmental Diseases, National Center for Emerging and Zoonotic Infectious Diseases, CDC.

[1]Div of Foodborne, Waterborne, and Environmental Diseases, National Center for Emerging and Zoonotic Infectious Diseases, CDC; [2]Environmental Protection Agency; [3]Div of Environmental Hazards and Health Effects, National Center for Environmental Health, CDC (Corresponding author: Michele C. Hlavsa, mhlavsa@cdc.gov, 404-718-4695).

References

1. CDC. Surveillance for waterborne disease outbreaks and other health events associated with recreational water—United States, 2007–2008. MMWR 2011;60(No. SS-12).
2. CDC. Communitywide cryptosporidiosis outbreak—Utah, 2007. MMWR 2008;57:989–93.
3. Cantey PT, Kurian AK, Jefferson D, et al. Outbreak of cryptosporidiosis associated with a man-made chlorinated lake—Tarrant County, Texas, 2008. J Environ Health 2012;75:14–9.
4. CDC. Cryptosporidiosis outbreak response and evaluation. Atlanta, GA: US Department of Health and Human Services; 2009. Available at http://www.cdc.gov/parasites/crypto/resources/core_guidelines.pdf.
5. Hudnell HK, Backer LC, Anderson J, Dionysiou DD. United States of America: historical review and current policy addressing cyanobacteria. In: Chorus I, ed. Current approaches to cyanotoxin risk assessment, risk management and regulations in different countries. Dessau, Germany: Federal Environment Agency (Umweltbundesamt); 2012:137–47.
6. Rabinovici SJ, Bernknopf RL, Wein AM, Coursey DL, Whitman RL. Economic and health risk trade-offs of swim closures at a Lake Michigan beach. Environ Sci Technol 2004;38:2737–45.
7. Hoagland P, Jin D, Polansky LY, et al. The costs of respiratory illnesses arising from Florida Gulf Coast *Karenia brevis* blooms. Environ Health Perspect 2009;117:1239–43.
8. Dodds WK, Bouska WW, Eitzmann JL, et al. Eutrophication of U.S. freshwaters: analysis of potential economic damages. Environ Sci Technol 2009;43:12–9.
9. CDC. Violations identified from routine swimming pool inspections—selected states and counties, United States, 2008. MMWR 2010;59:582–7.

Algal Bloom–Associated Disease Outbreaks Among Users of Freshwater Lakes — United States, 2009–2010

Elizabeth D. Hilborn, DVM[1], Virginia A. Roberts, MSPH[2], Lorraine Backer, PhD[3], Erin DeConno[4], Jessica S. Egan, MPH[4], James B. Hyde[4], David C. Nicholas, MPH[4], Eric J. Wiegert[4], Laurie M. Billing, MPH[5], Mary DiOrio, MD[5], Marika C. Mohr, MS[5], F. Joan Hardy, PhD[6], Timothy J. Wade, PhD[1], Jonathan S. Yoder, MPH[2], Michele C. Hlavsa, MPH[2] (Author affiliations at end of text)

Harmful algal blooms (HABs) are excessive accumulations of microscopic photosynthesizing aquatic organisms (phytoplankton) that produce biotoxins or otherwise adversely affect humans, animals, and ecosystems. HABs occur sporadically and often produce a visible algal scum on the water. This report summarizes human health data and water sampling results voluntarily reported to CDC's Waterborne Disease and Outbreak Surveillance System (WBDOSS) via the National Outbreak Reporting System (NORS) and the Harmful Algal Bloom-Related Illness Surveillance System (HABISS)* for the years 2009–2010. For 2009–2010, 11 waterborne disease outbreaks associated with algal blooms were reported; these HABs all occurred in freshwater lakes. The outbreaks occurred in three states and affected at least 61 persons. Health effects included dermatologic, gastrointestinal, respiratory, and neurologic signs and symptoms. These 11 HAB-associated outbreaks represented 46% of the 24 outbreaks associated with untreated recreational water reported for 2009–2010, and 79% of the 14 freshwater HAB–associated outbreaks that have been reported to CDC since 1978. Clinicians should be aware of the potential for HAB-associated illness among patients with a history of exposure to freshwater.

Eleven freshwater HAB–associated outbreaks that occurred in 2009 or 2010 were reported to CDC by New York, Ohio, and Washington. Freshwater HAB-associated outbreaks were defined as outbreaks where algal blooms were noted by state health or environmental investigators.† These outbreaks resulted in at least 61 illnesses, two (3%) hospitalizations, and no known deaths. Of 58 persons who reported seeking health care, seven (12%) reported a visit to an emergency department and 34 (59%) reported a visit to another type of health-care provider. Where demographic data were available, 34 ill persons were female (59%) and 38 (66%) were aged ≤19 years (Table 1). The median duration of an outbreak (time in days from the date of first reported exposure to the date of last reported exposure) was 9 days (range: 0–44 days).§ Onset time (time in days from reported exposure to reported onset of health effects) was not available for each reported illness. Among six outbreaks, the earliest onset of signs and symptoms reportedly occurred within 1 day of exposure. Among five outbreaks, median onset was calculated based on data for 27 persons; median onset times ranged from half a day to 2 days. All 11 outbreaks were associated with recreational activities at freshwater lakes during June, July, or August.

Health effects varied among outbreaks (Table 2). Effects included dermatologic signs or symptoms such as rash, irritation, swelling, or sores (eight outbreaks); gastrointestinal signs or symptoms (eight); respiratory signs or symptoms (six); fever (five); headache (four); neurologic signs or symptoms (four); ear symptoms (five); and eye irritation (three).¶ Three routes of exposure to recreational water were reported: contact (nine outbreaks), ingestion (six), and inhalation of aerosols (four) (Table 2). In seven (78%) of the outbreaks for which contact exposure was reported, affected persons developed rash or skin irritation; in each of the outbreaks for which ingestion exposure was reported, affected persons had gastrointestinal signs or symptoms; and in three (75%) of the outbreaks for which inhalation exposure was reported, affected persons had respiratory signs or symptoms.

Cyanobacteria are common components of freshwater HABs and can produce cyanotoxins, which include potent hepatotoxins, neurotoxins, and dermatotoxins that can harm humans and animals (*1*). Water testing practices varied among outbreak investigations (Table 3). Eight outbreak investigations included evaluation of cyanotoxins. Detections included microcystin (eight of eight investigations), anatoxin-a (three of four), saxitoxin (two of five), and cylindrospermopsin (two of five). Reported cyanotoxin concentrations varied over time. Four outbreak investigations included detection of multiple cyanotoxins; two of these investigations also revealed a potential association with bird, fish, or dog illness or deaths. Three

* The following states received grants to participate in HABISS: Florida, Iowa, Maryland, Massachusetts, New York, Oregon, South Carolina, Virginia, Washington, and Wisconsin.

† Two criteria must be met for a health event to be defined as an outbreak associated with recreational water: two or more persons must be linked epidemiologically, and the epidemiologic evidence must implicate recreational water as the probable source of illness. The reporting form and guidance for reporting via NORS are available at http://www.cdc.gov/nors. Outbreaks can be voluntarily reported to CDC by public health agencies in U.S. states, the District of Columbia, Guam, Puerto Rico, the Republic of the Marshall Islands, the Federated States of Micronesia, the Commonwealth of the Northern Mariana Islands, the Republic of Palau, and the U.S. Virgin Islands.

§ Based on information for 10 outbreaks; data missing for one outbreak.

¶ More than one type of health effect or exposure could be reported by a single person.

What is already known on this topic?

Cyanobacteria can form harmful algal blooms that might produce potent toxins in surface waters. Several studies have reported adverse human health effects associated with recreational water exposure to cyanotoxins and cyanobacteria blooms.

What is added by this report?

During 2009–2010 in the United States, 11 outbreaks associated with fresh water and harmful algal blooms affected at least 61 persons, resulting in two hospitalizations and no known deaths. Among 58 persons for whom data are available, seven (12%) visited an emergency department and 34 (59%) visited a health-care provider; 66% of affected persons overall were aged ≤19 years. This report suggests that the time to onset of effects might be rapid, that children might be at higher risk for illness, and that harmful algal bloom–associated outbreaks occur during the warmer months.

What are the implications for public health practice?

Untreated recreational waters with harmful algal blooms present a potentially severe health risk to humans and animals. Environmental control and prevention of blooms is needed. Efforts to identify and correctly ascertain algal bloom associated-illness will improve case detection and contribute to the development of evidence-based prevention strategies.

outbreak investigations identified cyanobacteria and two identified potentially toxic cyanobacteria without quantification. One outbreak investigation included testing for bacterial indicators of fecal contamination. *Escherichia coli* was identified and quantified; samples exceeded U.S. Environmental Protection Agency (EPA) recreational water quality criteria of 126 CFU/100 mL.**

Editorial Note

Outbreaks associated with freshwater HABs previously were reported infrequently; only three were reported to WBDOSS for 1978–2008.†† Freshwater cyanobacteria blooms are most likely to form on warm, stable bodies of water that are rich in nutrients (*1*). All outbreaks reported for 2009–2010 occurred in northern states during June–August. The World Health Organization (WHO) has proposed cell density guidelines for cyanobacteria bloom risk levels for recreational waters: 20,000 cells/mL is associated with risk for short-term adverse health outcomes; at 100,000 cells/mL, additional risk for long-term illness exists; and cyanobacterial scum formation in bathing areas is associated with the additional risk for "potentially severe health outcomes" (*2*).

This report highlights the challenges of recognizing HAB-associated illness. During recreation in or alongside water with HABs, persons might experience multiple routes of exposure and multiple health effects. Reported exposure routes might reflect reported health effects rather than the true exposure route, given the difficulty of determining if exposure occurred via ingestion, inhalation, or contact. Previous reports of health effects associated with recreational water exposure to HABs include gastrointestinal, respiratory, eye, ear, and dermatologic effects; fever and neurologic effects are reported less frequently (*3*). The nonspecific nature of these effects might make it difficult for health-care providers to identify HAB-associated illness. Health-care providers should be aware that HAB-associated illness might present differently from other recreational water–associated illnesses and onset might occur soon after exposure. For example, four of the HAB-associated outbreaks were notable for associated neurologic symptoms or confusion/visual disturbance and HAB-associated illness might occur soon after exposure (Table 2). Among the 11 reported outbreaks, most persons reporting illness were aged ≤19 years. Children might be at higher risk for HAB-associated health effects because of more frequent exposure to and greater ingestion of recreational water (4).§§

Animal deaths associated with HABs are sentinel events signaling potential risk for human illness associated with exposure to recreational waters. In two outbreaks, dead fish were reported by beach attendees and there were possibly associated dog deaths at each site. Biologic samples from affected persons and animals can be analyzed for cyanotoxins to improve exposure assessment; however, these assays are performed only by research or specialty laboratories at this time (*5–7*).

TABLE 1. Number and percentage of persons (n = 58*) affected by harmful algal bloom–associated waterborne disease outbreaks, by sex and age group — United States, 2009–2010

Characteristic	No.	(%)
Sex		
Female	34	(59)
Male	24	(41)
Age group (yrs)		
<1	0	—
1–4	4	(7)
5–9	16	(28)
10–19	18	(31)
20–49	12	(21)
50–74	8	(14)
≥75	0	—

* Three persons of unknown sex and age are not included.

** Additional information available at http://water.epa.gov/scitech/swguidance/standards/criteria/health/recreation/upload/factsheet2012.pdf.

†† One outbreak in New Hampshire (August 2001) in which *Oscillatoria* was suspected and isolated from a lake in a state park, and gastrointestinal symptoms were reported in 42 children; and two outbreaks in Nebraska (July 2004) involving microcystin from a lake, in which respiratory and dermatologic symptoms were reported in 22 persons. Additional information available at http://www.cdc.gov/healthywater/surveillance/rec-water-surveillance-reports.html.

§§ Data available at http://www.census.gov/compendia/statab/2012/tables/12s1249.pdf.

TABLE 2. Reported exposure, health effects, and health-care use resulting from harmful algal bloom–associated waterborne disease outbreaks — United States, 2009–2010

Outbreak (by state)	Cases	Health-care use*			Reported exposure†	Reported health effects (no.)§					
		Health-care provider	Emergency department	Hospitalized		Gastrointestinal	General	Dermatologic	Eye/Ear	Neurologic	Respiratory
New York (Outbreak 1)	2	1	0	0	Contact			Rash (2), swelling (1), sores (1)			
New York (Outbreak 2)	2¶	0	0	0	Contact				Watery eyes (2)		Nasal congestion (2)
New York (Outbreak 3)	2	0	0	0	Contact			Rash (2)			
Ohio (Outbreak 4)	3	1	0	0	Contact, ingestion, inhalation	Abdominal cramps (1), diarrhea (1), anorexia (1)	Dizziness (1), headache (1), muscle aches (1), fatigue (1), sore throat (2)	Rash (1), skin irritation (1)		Neurologic symptoms (1)	Cough (1), congestion (1), wheezing (1), shortness of breath (1)
Ohio (Outbreak 5)	19	19	0	0	Contact, ingestion, inhalation	Vomiting (11), nausea (11), abdominal cramps (7), diarrhea (5)	Fever (2)	Rash (6)	Eye irritation (5), earache (5)		
Ohio** (Outbreak 6)	7††	2	0	0	Contact, ingestion, inhalation	Anorexia (2), diarrhea (1), nausea (1)	Fever (2), fatigue (2), headache (1), muscle/joint pain (1), malaise (1), weakness (1), sore throat (1)	Rash (6), skin irritation (1)	Visual disturbance (1), earache (1)	Confusion (1)	Cough (1), wheezing (1)
Ohio (Outbreak 7)	9	3	2	0	Contact	Abdominal cramps (3), diarrhea (3), nausea (3), vomiting (2)	Fever (2), headache (2)	Rash (8)	Eye irritation (1), earache (1)	Neurologic symptoms (2), tingling (2), confusion (1)	Respiratory symptoms (1)
Ohio§§ (Outbreak 8)	8	5	5	1	Contact, ingestion, inhalation	Nausea (5), vomiting (4), diarrhea (4), abdominal cramps (2), anorexia (1)	Fever (4), headache (4), dizziness (1), fatigue (3), malaise (1), back pain (1)	Skin irritation (6), rash (3)	Earache (2)	Confusion (3), neurologic symptoms (3)	Respiratory symptoms (5), cough (2), wheezing (1), chest tightness (1)
Ohio (Outbreak 9)	2	0	0	0	Contact, ingestion	Diarrhea (2), vomiting (2)					
Washington (Outbreak 10)	3	2	0	0	Unknown	Gastroenteritis (3)	Fever (1)				
Washington (Outbreak 11)	4	1	0	1	Ingestion	Gastroenteritis (3)		Dermatologic symptoms (1)	Ear symptoms (1)		Respiratory symptoms (1)

* Multiple levels of health care might have been accessed by a person (e.g., used emergency department and was hospitalized). No deaths were reported.
† Route(s) of exposure reported for the outbreak via the National Outbreak Reporting System.
§ Multiple health effects might be reported by a person. Information about each symptom might not have been available for all persons in an outbreak.
¶ Health-care information is unknown for two persons in this outbreak.
** Dog and fish illness or death also reported.
†† Health-care information is unknown for one person in this outbreak.
§§ Dog, fish, and bird illness or death also reported.

It is important to maintain surveillance for HAB-associated illnesses to understand their public health impact. In the United States, cyanobacteria and their toxins are unregulated drinking water contaminants (*8*). No federal regulation of cyanobacteria nor cyanotoxins in drinking water or any recommended guideline values for recreational waters, no standardized methods for cyanotoxin detection in water or in biologic specimens, and no national monitoring programs for occurrence currently exist. However, many states rely on guidelines published by WHO (*2*); others have derived their own risk assessments and developed guidelines to support public health decision-making, such as posting advisories or closing bodies of

TABLE 3. Water quality indicators, by harmful algal bloom–associated waterborne disease outbreak — United States, 2009– 2010

Outbreak (by state)	Water quality indicators*					
	Cyanobacteria	*Escherichia coli*	Anatoxin-a (µg/L)	Cylindrospermopsin (µg/L)	Microcystin (µg/L)	Saxitoxin (µg/L)
New York (Outbreak 1)	X	—	—	—	112.5	—
New York (Outbreak 2)	—	—	—	—	—	—
New York (Outbreak 3)	X†	>126 CFU/mL§	—	—	—	—
Ohio (Outbreak 4)	—	—	0.05–0.1	ND	4.6	ND
Ohio (Outbreak 5)	—	—	—	—	>1,000.0	—
Ohio¶ (Outbreak 6)	X**	—	ND	ND	0.2	0.03
Ohio¶ (Outbreak 7)	—	—	—	ND	20.8	ND
Ohio¶ (Outbreak 8)	—	—	15.0	9.0	>2000.0	0.09
Ohio (Outbreak 9)	—	—	0.2	0.3	0.3	ND
Washington (Outbreak 10)	—	—	—	—	<6.0††	—
Washington (Outbreak 11)	—	—	—	—	—	—

Abbreviations: ND = not detected (Water test results indicated that the toxin was not present in water samples or that the concentration was below the level of detection); CFU = colony forming unit.

* Water quality indicators reported to the National Outbreak Reporting System or the Harmful Algal Bloom-Related Illness Surveillance System: identification of one or more cyanobacterial genera in lake water sample, *Escherichia coli,* and maximum cyanotoxin concentrations (i.e., within 1 day of outbreak exposure period).

† Both exposures occurred on a single day. *Microcystis* was identified by microscopy 3 days after the date of the exposure.

§ *E. coli* measurements exceeded 126 CFU/100 mL before, during, and after the exposure period. Reported levels were 328 CFU/100 mL (4 days prior), 488 CFU/100 mL (2 days prior), 152 CFU/100 mL (day of exposure), 248 CFU/100 mL (1 day after), and 222 CFU/100 mL (3 days after).

¶ Exposure occurred at a lake that was a water source for a public water system. Cyanotoxin analysis of finished water samples indicated that algal toxins were not present or that concentrations were below the limit of detection.

** Mixed toxigenic cyanobacteria bloom that included abundant cyanobacteria in succession: initially *Anabaena* spp., then *Cylindrospermopsis raciborskii*, *Aphanizomenon* spp., and *Planktolyngbya limnetica*. Four days after the date of last exposure, microcystin was not detected, saxitoxin was measured at 0.05 µg/L, and anatoxin-a was measured at 0.05–0.1 µg/L.

†† Microcystin measurements were >6 µg/L during the week before the outbreak.

water to any use (*3,9*). A summary of guidelines from different countries for exposure to cyanobacteria and their toxins was recently published (*10*).These guidelines and reports include action levels that might be applied by local, regional, state, or tribal entities to reduce exposure of humans and animals to cyanobacteria and their toxins. Although HABISS has been discontinued, NORS will continue to provide a mechanism for national reporting of HAB-associated outbreaks.

Testing water samples for cyanotoxins can contribute to the investigation of HAB-associated illness. Microcystins were detected during all eight outbreak investigations in which cyanotoxin testing was performed. Microcystin concentrations of ≥20 µg/mL exceeded the WHO guideline for moderate health risks in four outbreaks (Table 3) (*2*). During investigations of these outbreaks, saxitoxin, cylindrospermopsin, and anatoxin-a also were detected. To date, there are few reports of documented human exposure to these cyanotoxins in recreational waters and there are no United States or international public health guidelines on their concentrations. Notably, neurologic effects were reported in 75% of outbreaks that included detection of known neurotoxins (anatoxin-a and saxitoxin).

The findings in this report are subject to at least three limitations. First, outbreak detection varies among localities. Second, reporting is voluntary. Finally, the reports described here likely represent underreporting of freshwater HAB-associated outbreaks.

This report represents a first attempt to summarize a group of freshwater HAB-associated recreational waterborne disease outbreaks. More resources are needed for improvements in risk characterization of cyanobacteria and cyanotoxins exposure, water monitoring for potentially toxic cyanobacteria, cyanotoxin analysis of water samples and biologic specimens, and case-finding for human illnesses associated with exposure to HABs in recreational waters. HAB-associated outbreaks will likely increase as warm eutrophic bodies of water become more common over time as predicted by development and climate projections. Better characterization of the occurrence of blooms, bloom-associated environmental conditions, and of human illness associated with exposure to algal blooms is needed to develop evidence-based prevention strategies (e.g., optimized control of nitrogen and phosphorus nutrient pollution). EPA, which regulates recreational water quality, and CDC can support local and state health jurisdictions to optimize national outbreak surveillance, and thus better inform prevention and control efforts by providing guidance on what epidemiological, clinical, and environmental data are needed to support detection and investigation.

Acknowledgments

Mary Clifton, Carey Schwab, Ohio Bur of Infectious Disease; Kathleen Smith, Ohio Environmental Protection Agency. Kathryn MacDonald; Washington State Dept of Health.

[1]Environmental Public Health Div, Office of Research and Development, US Environmental Protection Agency; [2]Div of Foodborne, Waterborne, and Environmental Diseases, National Center for Emerging and Zoonotic Infectious Diseases, CDC; [3]Div of Environmental Hazards and Health Effects, National Center for Environmental Health, CDC; [4]New York State Dept of Health; [5]Ohio Dept of Health; [6]Washington State Dept of Health (Corresponding author: Elizabeth D. Hilborn, hilborn.e@epa.gov, 919-966-0658).

References

1. World Health Organization. Toxic cyanobacteria in water: a guide to their public health consequences, monitoring and management. Ingrid Chorus I, Bartram J, eds. London, United Kingdom: E&FN Spon; 1999. Available at http://www.who.int/water_sanitation_health/resourcesquality/toxcyanbegin.pdf.
2. World Health Organization. Guidelines for safe recreational water environments. Volume 1: coastal and fresh waters. Geneva, Switzerland: World Health Organization; 2003. Available at http://whqlibdoc.who.int/publications/2003/9241545801.pdf.
3. Stone D, Bress W. Addressing public health risks for cyanobacteria in recreational freshwaters: the Oregon and Vermont framework. Integr Environ Assess Manag 2007;3:137–43.
4. Dufour AP, Evans O, Behymer TD, Cantú R. Water ingestion during swimming activities in a pool: a pilot study. J Water Health 2006;4:425–30.
5. Furey A, Crowley J, Hamilton B, Lehane M, James KJ. Strategies to avoid the mis-identification of anatoxin-a using mass spectrometry in the forensic investigation of acute neurotoxic poisoning. J Chromatogr A 2005;1:91–7.
6. Gessner BD, Bell P, Doucette GJ, et al. Hypertension and identification of toxin in human urine and serum following a cluster of mussel-associated paralytic shellfish poisoning outbreaks. Toxicon 1997;5:711–22.
7. Hilborn ED, Carmichael WW, Soares RM, et al. Serologic evaluation of human microcystin exposure. Environ Toxicol 2007;5:459–63.
8. US Environmental Protection Agency. Water: contaminant candidate list 3 – CCL. Washington, DC: US Environmental Protection Agency; 2012. Available at http://water.epa.gov/scitech/drinkingwater/dws/ccl/ccl3.cfm.
9. Butler N, Carlisle J, Linville R. Toxicological summary and suggested action levels to reduce potential adverse health effects of six cyanotoxins. Sacramento, CA: Office of Environmental Health Hazard Assessment, California Environmental Protection Agency; 2012. Available at http://www.swrcb.ca.gov/water_issues/programs/peer_review/docs/calif_cyanotoxins/draft_cyanotoxinseport_oeha.pdf.
10. Chorus I (ed.). Current approaches to cyanotoxin risk assessment, risk management and regulations in different countries. Dessau-Rosslau, Germany: Federal Environment Agency (Umweltbundesamt); 2012. Available at http://www.umweltdaten.de/publikationen/fpdf-l/4390.pdf.

Vital Signs: Communication Between Health Professionals and Their Patients About Alcohol Use — 44 States and the District of Columbia, 2011

Lela R. McKnight-Eily, PhD[1], Yong Liu, MS[1], Robert D. Brewer, MD[1], Dafna Kanny, PhD[1], Hua Lu, MS[1], Clark H. Denny, PhD[2], Lina Balluz, PhD, ScD[3], Janet Collins, PhD[4] (Author affiliations at end of text)

On January 7, this report was posted as an MMWR *Early Release on the* MMWR *website (http://www.cdc.gov/mmwr).*

Abstract

Introduction: Excessive alcohol use accounted for an estimated 88,000 deaths in the United States each year during 2006–2010, and $224 billion in economic costs in 2006. Since 2004, the U.S. Preventive Services Task Force (USPSTF) has recommended alcohol misuse screening and behavioral counseling (also known as alcohol screening and brief intervention [ASBI]) for adults to address excessive alcohol use; however, little is known about the prevalence of its implementation. ASBI will also be covered by many health insurance plans because of the Affordable Care Act.

Methods: CDC analyzed Behavioral Risk Factor Surveillance System (BRFSS) data from a question added to surveys in 44 states and the District of Columbia (DC) from August 1 to December 31, 2011, about patient-reported communication with a health professional about alcohol. Elements of ASBI are traditionally delivered via conversation. Weighted state-level prevalence estimates of this communication were generated for 166,753 U.S. adults aged ≥18 years by selected demographic characteristics and drinking behaviors.

Results: The prevalence of ever discussing alcohol use with a health professional was 15.7% among U.S. adults overall, 17.4% among current drinkers, and 25.4% among binge drinkers. It was most prevalent among those aged 18–24 years (27.9%). However, only 13.4% of binge drinkers reported discussing alcohol use with a health professional in the past year, and only 34.9% of those who reported binge drinking ≥10 times in the past month had ever discussed alcohol with a health professional. State-level estimates of communication about alcohol ranged from 8.7% in Kansas to 25.5% in DC.

Conclusions: Only one of six U.S. adults, including binge drinkers, reported ever discussing alcohol consumption with a health professional, despite public health efforts to increase ASBI implementation.

Implications for Public Health Practice: Increased implementation of ASBI, including systems-level changes such as integration into electronic health records processes, might reduce excessive alcohol consumption and the harms related to it. Routine surveillance of ASBI by states and communities might support monitoring and increasing its implementation.

Introduction

Excessive alcohol use accounted for an estimated 88,000 deaths and 2.5 million years of potential life lost* in the United States each year during 2006–2010 (*1*), and an estimated $224 billion in economic costs in 2006 (*2*). Excessive alcohol use is associated with increases in the chances of heart disease, breast cancer, sexually transmitted diseases, unintended pregnancy, fetal alcohol spectrum disorders, sudden infant death syndrome, motor-vehicle crashes, violence, suicide, and many other health problems (*3*). It includes binge drinking, exceeding weekly limits (for men, 15 or more on average in a week; for women, eight or more on average per week); and any use by pregnant women or persons aged <21 years.† A standard drink is considered 12 ounces of 5% beer, 5 ounces of 12% wine, or 1.5 ounces (a shot) of 80-proof distilled spirits or liquor (e.g., gin, rum, vodka, or whiskey). In 2011, binge drinking was reported by 18.3% of U.S. adults (38 million persons) surveyed through the Behavioral Risk Factor Surveillance System (BRFSS),§ who reported doing so an average of approximately four times a month and consuming approximately eight drinks per occasion on average (*4*).

* YPLL for 2006–2010 were estimated using the Alcohol-Related Disease Impact (ARDI) application using death and life expectancy data from the National Vital Statistics System. Additional information is available at http://apps.nccd.cdc.gov/dach_ardi/default/default.aspx.

† Additional information available at http://www.cdc.gov/alcohol/faqs.htm#excessivealcohol.

§ Additional information available at http://apps.nccd.cdc.gov/brfss.

In 2005, the National Institute on Alcohol Abuse and Alcoholism (NIAAA) published updated ASBI clinical guidelines (*5*) to include screening for the number of days of binge-level alcohol consumption in the past year among adults.[¶] ASBI traditionally involves a conversation between a health professional and patient to screen using a standardized set of questions (can be by form) and/or discuss the results of screening for excessive alcohol use. For those who screen positive, the brief counseling intervention involves a dialogue about motivations and steps to reduce drinking because of health dangers, based on consumption guidelines and the patient's medical status. The small number of patients who are alcoholics or have a severe alcohol use disorder should be referred for specialized treatment. Since 2004, the U.S. Preventive Services Task Force (USPSTF) has recommended alcohol misuse screening and behavioral counseling (also known as alcohol screening and brief intervention or ASBI) for all adults in primary care, including pregnant women, to address excessive alcohol use (*6*).

This review of evidence indicated that brief (6–15 minutes) intervention sessions were effective in significantly reducing weekly alcohol consumption (by 3.6 fewer drinks/week for adults) and binge level episodes (reported by 12% fewer participants), and increasing adherence to recommended drinking limits (achieved by 11% more participants). Further, effects can last for years and show improvement in health-care utilization outcomes including fewer hospital days and lower costs. However, despite evidence of effectiveness and longstanding recommendations for ASBI implementation, limited information is available to assess aspects such as communication between a health professional and patient. This analysis is based on data from the responses of U.S. adults to a single question about their dialogue with a health professional about alcohol use. This question was initially added to the BRFSS as a part of a clinical preventive services optional module included on some state surveys during 1996–1999.

Methods

BRFSS is an annual, state-based, random-digit–dialed telephone survey of noninstitutionalized U.S. adults aged ≥18 years that collects information on health conditions and risk behaviors, including alcohol use (*7*). From August 1 through December 31, 2011, all BRFSS respondents in 44 states and DC were read the following lead-in statement: "The next question is about counseling services related to prevention that you might have received from a doctor, nurse, or other health professional." Respondents were then asked: "Has a doctor or other health professional ever talked with you about alcohol use?" as an emerging core question. Respondents who answered affirmatively were asked when the talk occurred (e.g., within the past year). Responses were stratified by selected sociodemographic variables and drinking behavior (current drinking, binge drinking, and frequency of binge drinking).[**] In 2011, the overall median survey response rate[††] was 49.7% (range: 33.8%–64.1%); for states included in this report, the range was 33.8%–61.4%). A total of 166,753 respondents (including 20,711 cellular telephone respondents) were included in the analysis. Weighted prevalence estimates were derived using statistical software. Two-tailed t-tests were used to assess statistical significance ($p<0.05$). Comparisons are statistically significant unless otherwise noted.

Results

The overall weighted prevalence of ever having dialogue with a health professional about alcohol use was 15.7% (Table 1), and past year prevalence was 7.6%. Ever discussing alcohol use was significantly higher for men (19.0%) than women (12.5%) and similar among pregnant (17.3%) and nonpregnant (16.9%) women aged 18–44 years. It was more common among those aged 18–24 (27.9%) and declined significantly with increasing age. The prevalence of ever having dialogue about alcohol use with a health professional was significantly higher for Hispanics (22.5%) and non-Hispanic blacks (19.4%) than for non-Hispanic whites (13.7%) and other non-Hispanics (15.8%). Respondents without a high school diploma (19.9%) and those with an annual household income of <$25,000 (20.2%) had a significantly higher prevalence than those with higher education and income levels. Prevalence was also significantly higher among those unable to work (29.2%) than among the employed (14.6%) or retired (10.2%) and was higher among persons without health insurance coverage (20.0%) than those with health insurance (14.8%). Finally, this dialogue was significantly more common among never-married respondents (23.6%) and members of an unmarried couple (19.9%) than among married respondents (12.6%), and divorced, widowed, or separated persons (15.0%).

¶ The NIAAA-recommended screening question for heavy drinking days is as follows: "How many times in the past year have you had five or more drinks in a day (for men) or four or more drinks in a day (for women)?"

** Binge drinkers were defined as respondents who consumed four or more drinks per occasion during the preceding 30 days for women and five or more drinks for men. Frequency of binge drinking was calculated based on the total number of binge drinking episodes during the past 30 days. An occasion is generally defined as 2–3 hours.

†† Response rates for BRFSS are calculated using standards set by the American Association of Public Opinion Research response rate formula no. 4, available at http://www.aapor.org/standard_definitions2.htm. The response rate is the number of respondents who completed the survey as a proportion of all eligible and likely eligible persons. The cooperation rate median and range was 54.6% to 89.0% (median: 77.0%). The cooperation rate is the percentage of persons who completed interviews among all eligible persons who were contacted. Additional information is available at http://www.cdc.gov/brfss/pdf/2011_summary_data_quality_report.pdf.

TABLE 1. Weighted prevalence of discussing alcohol use with a doctor or other health professional among U.S. adults, by sociodemographic characteristics — Behavioral Risk Factor Surveillance System, 44 states and the District of Columbia, August 1–December 31, 2011

		Talked with about alcohol use			
		Ever		During past year	
Characteristic	Unweighted No.	%	(95% CI)	%	(95% CI)
Total	**166,753**	**15.7**	**(15.0–16.4)**	**7.6**	**(6.9–8.2)**
Sex					
Men	64,836	19.0	(17.9–20.3)	9.2	(8.0–10.5)
Women	101,917	12.5	(12.0–13.1)	6.0	(5.7–6.4)
Pregnancy status (females aged 18–44 yrs only)					
Yes	998	17.3	(13.4–21.6)	11.9	(9.0–15.6)
No	23,996	16.9	(15.9–17.9)	8.2	(7.6–8.9)
Age (yrs)					
18–24	6,529	27.9	(24.2–32.1)	15.9	(12.0–20.6)
25–34	15,411	17.1	(16.0–18.1)	7.8	(7.1–8.6)
35–44	21,333	14.6	(13.7–15.5)	6.5	(6.0–7.2)
45–64	68,414	14.6	(13.9–15.2)	6.7	(6.3–7.1)
≥65	53,525	9.3	(8.8–9.8)	4.2	(3.9–4.6)
Race/Ethnicity					
White, non-Hispanic	130,722	13.7	(13.3–14.1)	6.2	(6.0–6.5)
Black, non-Hispanic	14,844	19.4	(17.9–21.0)	10.6	(9.4–11.9)
Hispanic	10,379	22.5	(19.1–26.3)	11.9	(8.6–16.4)
Other, non-Hispanic*	8,916	15.8	(14.2–17.5)	6.9	(5.9–8.0)
Education					
Less than high school diploma	14,326	19.9	(18.4–21.5)	9.6	(8.4–10.9)
High school diploma or equivalent	47,456	16.7	(15.7–17.6)	7.8	(7.3–8.5)
Some college	44,601	15.4	(14.6–16.2)	6.7	(6.2–7.3)
College graduate	60,017	13.4	(12.8–13.9)	6.6	(6.2–7.0)
Employment status					
Employed	81,353	14.6	(14.1–15.1)	6.8	(6.5–7.2)
Unemployed	10,042	19.7	(18.0–21.5)	9.3	(8.3–10.4)
Retired	48,177	10.2	(9.6–10.8)	4.6	(4.3–5.0)
Unable to work	12,224	29.2	(22.5–36.8)	15.1	(8.5–25.4)
Homemaker or student	14,418	18.6	(17.1–20.1)	9.7	(8.6–10.9)
Marital status					
Married	88,982	12.6	(12.2–13.1)	6.1	(5.8–6.4)
Divorced, widowed, separated	50,181	15.0	(14.0–16.0)	6.1	(5.7–6.6)
Never married	22,756	23.6	(21.2–26.1)	12.4	(10.0–15.3)
Member of unmarried couple	4,121	19.9	(17.3–22.8)	8.7	(7.2–10.5)
Annual household income					
<$25,000	42,675	20.2	(18.2–22.4)	9.8	(7.8–12.2)
$25,000 to <$50,000	37,920	14.4	(13.6–15.3)	6.3	(5.7–6.9)
$50,000 to <$75,000	22,854	13.7	(12.8–14.7)	5.9	(5.4–6.6)
≥$75,000	40,466	13.6	(12.9–14.3)	7.3	(6.7–7.8)
Health insurance coverage					
Yes	148,057	14.8	(14.4–15.3)	7.3	7.3(7.0–7.6)
No	18,200	20.0	(17.0–23.3)	9.0	(6.1–13.0)
Current alcohol consumption					
Yes	85,870	17.4	(16.4–18.4)	9.0	(8.0–10.0)
No	79,762	13.5	(12.8–14.2)	5.7	(5.3–6.2)
Binge drinking†					
Yes	20,993	25.4	(22.8–28.3)	13.4	(10.6–16.7)
No	143,788	13.5	(13.0–13.9)	6.2	(5.9–6.5)

Abbreviation: CI = confidence interval.
* Includes Asian, Native Hawaiian or other Pacific Islander, American Indian or Alaskan Native, other race, and multiracial.
† Binge drinking is defined as four or more drinks on at least one occasion during the past 30 days for women or five or more drinks on at least one occasion during the past 30 days for men.

The prevalence of ever having been spoken with about alcohol by a health professional was 17.4% among current drinkers and 13.5% among nondrinkers (Table 1). Prevalence among binge drinkers (25.4%) was approximately twice that of non-binge drinkers (13.5%), and increased significantly with the number of binge drinking episodes, ranging from 23.6% (95% confidence interval [CI]: 19.4–28.4) among those reporting one to two episodes to 34.9% (95% CI: 29.7–40.4) among those reporting ≥10 episodes during the past 30 days (Figure 1).

Overall, state-based estimates of ever having communication with a health professional about alcohol ranged from 8.7% in Kansas to 25.5% in DC, with the highest concentration in the northeastern states and lowest in the middle southern states (Table 2). However, most state prevalence estimates were not significantly different from the overall mean prevalence for all participating states (Figure 2).

Conclusions and Comment

The results of this analysis indicate that in 2011, only one in six U.S. adults overall, one in five current drinkers, and one in four binge drinkers in 44 states and DC reported ever discussing alcohol use with a doctor or other health professional. Further, 65.1% of those who reported binge drinking ≥10 times in the past month had never had this dialogue. These findings are consistent with previous reports: in 1997, only 23% of U.S. adult binge drinkers in 10 states reported being spoken with about alcohol use on the BRFSS, and in a 2011 study, only 14% of young adults who reported exceeding alcohol consumption guidelines and visiting a doctor were asked about their alcohol use (*8,9*).

Variations in participant recall of their interactions with their health professionals or differences in the offering of certain clinical preventive services in primary care environments might have affected these communications. Nonetheless, the overall prevalence of health professionals talking with patients regarding alcohol use is still very low, based on findings from this and similar reports, despite USPSTF recommendations for all adults in primary care to be screened and receive brief counseling, if warranted. A survey of U.S. adults in 12 metropolitan areas found that preventive care interventions, including screening for problem drinking, were underused. Only 54.9% of the recommended percentage of preventive care, 18.3% of recommended counseling or education, and 10.5% of recommended care was received for alcohol dependence (*10*). Even

FIGURE 1. Weighted prevalence of ever discussing alcohol use with a doctor or other health professional among U.S. adult binge drinkers, by binge drinking frequency in the past month — Behavioral Risk Factor Surveillance System, 44 states and the District of Columbia, 2011

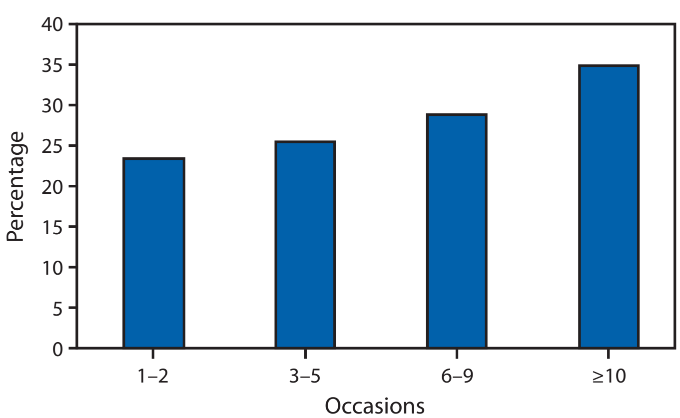
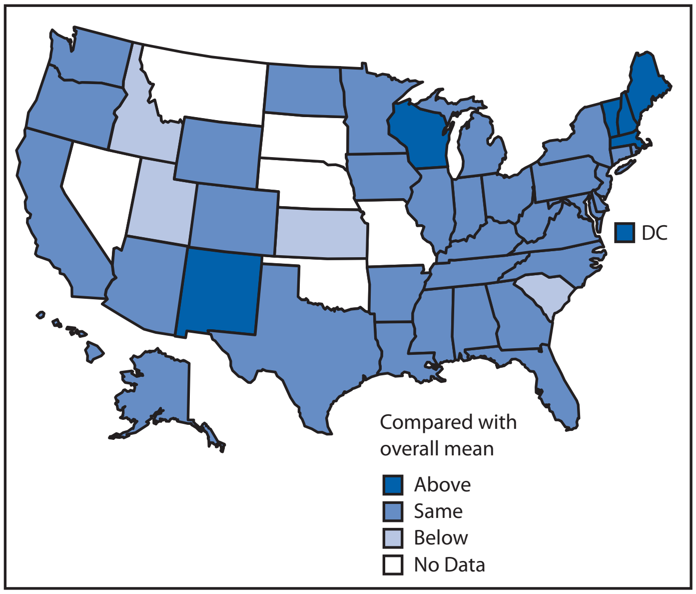


TABLE 2. Age-adjusted prevalence of ever discussing alcohol use with a doctor or other health professional among U.S. adults, in comparison with overall mean estimate — Behavioral Risk Factor Surveillance System, 44 states and the District of Columbia, August 1–December 31, 2011

State	%	(95% CI)
State average	15.8	(15.2–16.5)
Above state average*		
District of Columbia	25.5	(22.5–28.7)
Maine	19.6	(17.9–21.4)
Massachusetts	21.2	(19.7–22.8)
New Hampshire	21.1	(18.9–23.5)
New Mexico	18.7	(16.8–20.7)
Rhode Island	19.1	(16.9–21.7)
Vermont	20.0	(17.9–22.3)
Wisconsin	21.6	(18.3–25.2)
On state average†		
Alabama	15.5	(13.6–17.7)
Alaska	16.6	(14.0–19.6)
Arizona	15.4	(12.9–18.4)
Arkansas	12.7	(10.2–15.7)
California	15.4	(14.3–16.6)
Colorado	15.3	(13.8–17.0)
Connecticut	17.6	(15.4–20.1)
Delaware	16.7	(14.5–19.3)
Florida	18.7	(12.9–26.5)
Georgia	14.9	(13.4–16.7)
Hawaii	17.8	(15.8–20.1)
Illinois	14.4	(12.4–16.5)
Indiana	16.5	(14.6–18.6)
Iowa	15.3	(13.6–17.3)
Kentucky	14.3	(12.4–16.3)
Louisiana	14.4	(12.8–16.2)
Maryland	16.8	(15.0–18.9)
Michigan	14.9	(13.2–16.9)
Minnesota	14.6	(13.3–16.0)
Mississippi	13.9	(12.3–15.8)
New Jersey	14.4	(12.9–15.9)
New York	18.2	(15.9–20.8)
North Carolina	14.6	(12.9–16.4)
North Dakota	16.6	(14.2–19.3)
Ohio	16.5	(14.6–18.5)
Oregon	14.7	(12.5–17.3)
Pennsylvania	15.2	(13.6–16.9)
Tennessee	13.9	(11.0–17.4)
Texas	15.2	(13.5–17.0)
Virginia	14.5	(12.3–17.1)
Washington	16.0	(14.1–18.0)
West Virginia	14.1	(12.3–16.2)
Wyoming	14.9	(13.1–16.9)
Below state average§		
Idaho	11.9	(10.1–14.0)
Kansas	8.7	(7.8–9.8)
South Carolina	13.6	(12.2–15.2)
Utah	11.8	(10.6–13.1)

Abbreviation: CI = confidence interval.
* Statistically above the stage average at p<0.05, based on two-tailed t-tests.
† No statistical difference from the state average at p<0.05, based on two-tailed t-tests.
§ Statistically below the state average at p<0.05, based on two-tailed t-tests.

FIGURE 2. Age-adjusted prevalence of ever discussing alcohol use with a doctor or other health professional among U.S. adults, in comparison with overall mean estimate — Behavioral Risk Factor Surveillance System, 44 states and the District of Columbia, August 1–December 31, 2011



among trauma and hepatitis patients, documented screening for problem drinking during hospitalization was low (*11*).

The findings in this report are subject to at least five limitations. First, BRFSS data are based on self-report and dependent on respondent recall of dialogue with a health professional, which can vary based on the time since the patient's last visit or other factors that could have affected patient recall, thus resulting in underreporting. Second, respondents were asked to report only whether they "talked with" a health professional about their alcohol consumption, not whether they reported their alcohol consumption in some other manner (e.g., on a patient history form) or if they were actually screened or received an intervention. However, NIAAA recommends that regardless of the screening method used, health professionals should discuss alcohol use with all patients. For patients who drink, but not excessively, the discussion (or a patient brochure) should focus on maximum drinking limits and situations when less drinking, or no drinking (as for pregnant women, persons aged <21 years, and those with health conditions or taking medications that interact negatively with alcohol) is advisable. The Dietary Guidelines for Americans also recommend that adults who drink only do so in moderation, defined as up to one drink a day for women and two for men, and not starting to drink more for possible health benefits (*12*). NIAAA provides guidelines for discussions for persons who screen positive for excessive drinking (which includes binge drinking) in its Clinicians' Guide (*5*). The data also did not include information on the extent of the alcohol intervention and changes in drinking behavior that might result. Third, the data used in this analysis were only collected in 44 states and DC and for a portion of the year (i.e., August 1–December 31, 2011); therefore, prevalence estimates might not be representative of the entire United States. Fourth, BRFSS does not collect information by landline from persons living in institutional settings (e.g., on military bases), and the prevalence of talking with a health professional about alcohol consumption might be different in these groups. Finally, the survey median response rate was 49.7%, raising the possibility of response bias.

ASBI was ranked by the National Commission on Prevention Priorities as one of the five most effective clinical preventive services (along with blood pressure control, low cholesterol, breast cancer screening, and annual influenza vaccination), based on the clinically preventable burden of disease and intervention cost effectiveness (*13*). The Affordable Care Act of 2010 allows for health insurance coverage for ASBI,[§§] billing codes are available for ASBI services,[¶¶] and model benefit plan language for ASBI has been developed for use in public and private health insurance plans.[***] ASBI has also been endorsed by national health organizations, and implementation guidelines have been published by NIAAA, the World Health Organization, and CDC (*5,14,15*). Further, the Substance Abuse and Mental Health Services Administration has funded grantees and is collaborating with the Centers for Medicare and Medicaid Services to educate health-care providers about Medicare billing and insurance coverage for alcohol SBI services.[†††] Additional federal efforts include requiring states with expanded Medicaid to cover a set of preventive services, including alcohol screening and counseling through the Affordable Care Act (*16*), and studying the best means for implementing alcohol screening and counseling at federally qualified health centers (*17*).

Barriers to screening and counseling identified by health-care providers include lack of time, training, and self-efficacy; discomfort discussing the topic; perceived difficulty working with substance use patients; skepticism of treatment effectiveness;

§§ The Patient Protection and Affordable Care Act of 2010 requires that nongrandfathered private health plans provide coverage without cost-sharing for services that have in effect an "A" or "B" recommendation from the USPSTF. Because the USPSTF issued a "B" recommendation for ASBI in adults aged ≥18 years, this must be covered by such plans, Section 1001 of the Patient Protection and Affordable Care Act, Public Law 111-148, 2010. Available at http://www.gpo.gov/fdsys/pkg/PLAW-111publ148/html/PLAW-111publ148.htm.

¶¶ Dedicated Healthcare Common Procedure Coding System (HCPCS) codes H0049 and H0050, which health-care providers can use to bill Medicare and Medicaid for ASBI services, and Current Procedural Terminology (CPT) codes 99408 and 99409.

*** Additional information available at https://www.healthcare.gov/what-are-my-preventive-care-benefits/#. http://www.businessgrouphealth.org/pub/f2f59214-2354-d714-5198-3a8968092869.

††† Additional information available at http://www.samhsa.gov/prevention/sbirt.

Key Points

- In 2011, only about one in six U.S. adults and one in four binge drinkers in 44 states and the District of Columbia (DC) reported that a health professional had ever discussed alcohol use with them. This has changed very little in the past 15 years.
- Excessive alcohol use, including binge drinking, is responsible for approximately 88,000 deaths in the United States each year, and cost the nation an estimated $224 billion in 2006.
- Alcohol screening and brief intervention (ASBI) or counseling is an effective strategy that health professionals can use to help their adult patients, including pregnant women, reduce excessive alcohol use.
- ASBI traditionally involves a conversation between a health-care provider and patient to screen or interpret the results of screening for excessive alcohol use. For those who screen positive, the intervention involves a dialogue about motivations and steps to reduce drinking, based on consumption guidelines and the patient's medical status.
- Discussing alcohol consumption was most prevalent among persons aged 18–24 years (27.9%) and those who reported binge drinking ≥10 times in the past month (34.9%).
- The prevalence of health-care professional communication about alcohol ranged from 8.7% in Kansas to 25.5% in DC.
- Increased implementation of ASBI-related services could help reduce excessive alcohol consumption and the harms related to it.
- Routine surveillance of ASBI-related services could support its implementation and monitoring of progress.
- Additional information is available at http://www.cdc.gov/vitalsigns.

patient resistance; and lack of insurance coverage (*18*). These and other implementation barriers might be addressed through health professional organizations working to increase training and education for health providers and working with employers to understand the benefits of including ASBI as a part of their health plans. Systems-level changes by health plans and insurers, such as adopting recommended guidelines, including ASBI as a part of standard service that all patients receive, providing insurance coverage, and incentives for the delivery of ASBI, also might address barriers and improve implementation (*18,19*). A key aspect of routinizing alcohol screening and counseling as standard practice in medical practice includes ensuring that staff comprehend that most patients who drink too much will only require brief counseling, not specialized treatment. Support from key staff members and stakeholders, including the development and testing of an implementation plan, and training on the use of guidelines, is also needed (*20*). Finally, the use of a variety of health professionals (e.g., doctors, nurses, clinical social workers) to screen all patients, including women who are or could be pregnant (should be advised not to drink at all), and intervene with those who screen positive for drinking too much through the use of approved guidelines (*5,6,18*), can also address provider concerns, particularly about time and efficacy. Screening and counseling can also occur in several settings, including emergency departments, trauma centers, and OB/GYN practices (*20*).

The Community Preventive Services Task Force has recommended several community level interventions to reduce excessive alcohol use,[§§§] including electronic screening and brief intervention (e.g., use of computers, telephones, or mobile devices to deliver components of ASBI), which have reduced peak consumption by 25% among binge drinkers in reviewed studies and might help to reduce implementation barriers in clinical settings. Providing physicians and other health professionals with prompts and feedback regarding ASBI might also be an effective strategy. For example, ASBI is being considered for inclusion as a meaningful use measure[¶¶¶] in the electronic health records process which, if included and then implemented, might increase its use.

§§§ The Community Preventive Services Task Force has recommended several community-based strategies for preventing excessive alcohol consumption (e.g., increasing alcohol taxes, regulating alcohol outlet density, and holding alcohol retailers liable for harms related to the sale of alcoholic beverages to minors and intoxicated patrons (dram shop liability). Additional information available at http://www.thecommunityguide.org/alcohol/index.html.

¶¶¶ Additional information available at http://www.healthit.gov/policy-researchers-implementers/meaningful-use.

Acknowledgments

BRFSS state coordinators, Machell Town, PhD, William Garvin, Kurt Greenlund, PhD, Div of Population Health, National Center for Chronic Disease Prevention and Health Promotion; Dan Hungerford, PhD, John Higgins-Biddle, PhD, Div of Birth Defects and Developmental Disabilities, National Center on Birth Defects and Developmental Disabilities, CDC.

[1]Div of Population Health, National Center for Chronic Disease Prevention and Health Promotion, CDC; [2]Div of Birth Defects and Developmental Disabilities, National Center for Birth Defects and Developmental Disabilities, CDC; [3]Div Of Environmental Hazards & Health Effects, National Center for Environmental Health, CDC; [4]Div of Nutrition, Physical Activity, and Obesity, National Center for Chronic Disease Prevention and Health Promotion, CDC (Corresponding author: Lela R. McKnight-Eily, dvn1@cdc.gov, 404-498-2401).

References

1. CDC. Alcohol-attributable deaths and years of potential life lost, United States, 2001. MMWR 2004;53:886–70.
2. Bouchery EE, Harwood HJ, Sacks JJ, Simon CJ, Brewer RD. Economic costs of excessive alcohol consumption in the United States, 2006. Am J Prev Med 2011;41:516–24.
3. National Institute of Alcohol Abuse and Alcoholism. Tenth special report to the U.S. Congress on alcohol and health. Bethesda, MD: National Institute of Health, 2000. Available at http://pubs.niaaa.nih.gov/publications/10report/10thspecialreport.pdf.
4. CDC. Binge drinking—United States, 2011. MMWR 2013;62(Suppl 3):77–80.
5. National Institutes of Health, National Institute on Alcohol Abuse and Alcoholism. helping patients who drink too much: a clinician's guide, 5th ed. Bethesda, MD: US Department of Health and Human Services; 2005.
6. Moyer VA; US Preventive Services Task Force. Screening and behavioral counseling interventions in primary care to reduce alcohol misuse: U.S. Preventive Services Task Force recommendation statement. Ann Intern Med 2013;159:210–8.
7. CDC. Methodologic changes in the Behavioral Risk Factor Surveillance System in 2011 and potential effects on prevalence estimates. MMWR 2012;61:410–3.
8. Denny CH, Serdula MK, Holtzman D, Nelson DE. Physician advice about smoking and drinking: are U.S. adults being harmed? Am J Prev Med 2003;24:71–4.
9. Hingson R.W, Heeren, T, Edwards, EM, Saitz, R. Young adults at risk for excess alcohol consumption are often not asked or counseled about drinking alcohol. J Gen Intern Med 2012;27:179–84.
10. McGlynn EA, Asch SM, Adams J, et al. The quality of health care delivered to adults in the United States. N Engl J Med 2003;348:2635–45.
11. McGlynn EA, Asch SM, Adams JL, et al. The quality of health care delivery to adults in the United States: appendix. Santa Monica, CA: Rand Corporation; 2006. Available at http://www.rand.org/pubs/working_papers/WR174-1.html.
12. US Department of Agriculture, US Department of Health and Human Services. Foods and food components to reduce [Chapter 3]. In: Dietary guidelines for Americans, 2010. 7th Ed. Washington, DC: US Government Printing Office; 2010:30–32.
13. Maciosek MV, Coffield AB, Edwards NM, Flottemesch TJ, Solberg LI. Prioritizing clinical preventive services: a review and framework with implications for community preventive services. Annu Rev Public Health 2009;30:341–55.
14. World Health Organization. AUDIT, the alcohol use disorders identification test: guidelines for use in primary care. Geneva, Switzerland: World Health Organization; 2001. Available at http://www.talkingalcohol.com/files/pdfs/WHO_audit.pdf.
15. Higgins-Biddle J, Hungerford D, Cates-Wessel K. Screening and brief interventions (SBI) for unhealthy alcohol use: a step-by-step implementation guide for trauma centers. Atlanta, GA: US Department of Health and Human Services, CDC; 2009. Available at http://www.cdc.gov/injuryresponse/alcohol-screening/pdf/sbi-implementation-guide-a.pdf.
16. Centers for Medicare & Medicaid Services. Medicaid and Children's Health Insurance Programs: essential health benefits in alternative benefit plans, eligibility notices, fair hearing and appeal processes, and premiums and cost sharing; exchanges: eligibility and enrollment. Federal Register 78:42159–322.
17. Substance Abuse and Mental Health Services Administration. SBIRT: a resource toolkit for behavioral health providers to begin the conversation with federally qualified healthcare centers. Rockville, MD: Substance Abuse and Mental Health Services Administration; 2011. Available at http://www.integration.samhsa.gov/sbirt_toolkit_for_working_with_fqhcs.pdf.
18. Yoast RA, Wilford BB, Hayashi SW. Encouraging physicians to screen for and intervene in substance use disorders: obstacles and strategies for change. J Addict Dis 2008;27:77–97.
19. Garnick DW, Horgan CM, Merrick EL, Hoyt A. Identification and treatment of mental and substance use conditions: health plans strategies. Medical Care 2007;11:1–7.
20. American Public Health Association and Education Development Center, Inc. Alcohol screening and brief intervention: a guide for public health practitioners. Washington DC: National Highway Traffic Safety Administration, US Department of Transportation; 2008. Available at http://www.apha.org/NR/rdonlyres/B03B4514-CCBA-47B9-82B0-5FEB4D2DC983/0/SBImanualfinal4_16.pdf.

Notice to Readers

New Instructions for Authors of Reports Published in *MMWR* Weekly

The *MMWR* Weekly policy regarding listing of authors has changed. Contributing authors are now listed as "authors," rather than "contributors." Criteria for authorship of all *MMWR* reports now follow the recommendations of the International Committee on Medical Journal Editors (ICMJE): "Authorship credit should be based on 1) substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; 2) drafting the article or revising it critically for important intellectual content; and 3) final approval of the version to be published. Authors should meet conditions 1, 2, and 3" (available at http://www.icmje.org/ethical_1author.html).

In accordance with CDC policy, the order for listing authors should be a joint decision of the coauthors. *MMWR* recommends that author order be discussed early during collaboration and revised as needed as the work progresses, and that authorship order, including choice of first author, should be based on the level of contribution to the report and the work underlying it. The first author will have responsibility for the integrity of the work as a whole from inception to publication. The requirement that all *MMWR* reports be cleared at CDC before publication is unchanged, and content remains in the public domain. *MMWR* instructions for authors have been updated and are available at http://www.cdc.gov/mmwr/contributors/index.html.

Errata

Vol. 60, No. 53

In the "Summary of Notifiable Diseases, United States, 2011," on page 26, in Table 1, the row for "Ehrlichiosis/Anaplasmosis" should have been left blank, with no values. Three rows down, above "Undetermined," the row for "*Anaplasma phagocytophilum*" should have been inserted with all of the values that were incorrectly listed for "Ehrlichiosis/Anaplasmosis."

In addition, on page 41, in Table 3, the row for "Ehrlichiosis/Anaplasmosis" should have been left blank, with no values. Three rows down, above "Undetermined," the row "*Anaplasma phagocytophilum*" should have been inserted with all of the values that were incorrectly listed for "Ehrlichiosis/Anaplasmosis."

Finally, on page 43, in Table 4, the diseases are presented out of order. The order should be as follows: *Anaplasma phagocytophilum*, *Ehrlichia chaffeensis*, *Ehrlichia ewingii*, and Undetermined. The total counts are in correct order.

Vol. 62, No. 33

In the report, "Final 2012 Reports of Nationally Notifiable Diseases," in Table 2, multiple errors occurred. On page 671, for Babesiosis, United States, the values for Total, Confirmed, and Probable should read **937**, **716**, and **221**, respectively. For Babesiosis, S. Atlantic, the values for Total, Confirmed, and Probable should read **3**, **1**, and **2**, respectively. For Babesiosis, District of Columbia, the entries for Total, Confirmed, and Probable all should read **N**. On page 679, for Rabies, Animal, the United States value should read **4,541**; the E.N. Central value should read **170**, and the Illinois value should read **63**.

On page 662, the bottom section of Table 2 should appear as follows:

Vol. 62, Nos. 51 & 52

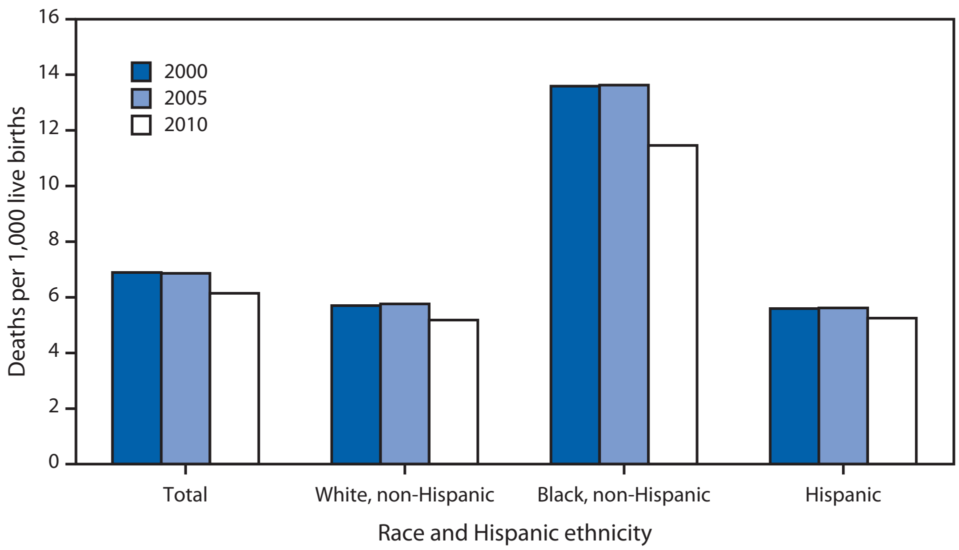
In the second announcement on page 1052, an error occurred in the first sentence of the second paragraph. That sentence should read, "January **5–11**, 2014, is National Folic Acid Awareness Week.

Area	*Chlamydia trachomatis* infection[†]	Cholera	Coccidioidomycosis	Cryptosporidiosis			Cyclosporiasis
				Total	Confirmed	Probable	
Territories							
American Samoa	—	—	N	N	N	N	N
C.N.M.I.	—	—	—	—	—	—	—
Guam	1,031	—	—	—	—	—	—
Puerto Rico	6,227	—	N	N	N	N	N
U.S. Virgin Islands	802	—	—	—	—	—	—

QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Infant Mortality Rates,* by Race and Hispanic Ethnicity of Mother — United States, 2000, 2005, and 2010



* Per 1,000 live births.

The U.S. infant mortality rate plateaued during 2000–2005, then declined from 6.86 infant deaths per 1,000 live births in 2005 to 6.14 in 2010. Declines from 2005 to 2010 were largest for non-Hispanic black women (from 13.63 to 11.46), followed by non-Hispanic white (from 5.76 to 5.18) and Hispanic women (from 5.62 to 5.25). In 2000 and 2005, the non-Hispanic black infant mortality rates were 2.4 times the non-Hispanic white rates; however, the difference between the two rates has narrowed, and in 2010, the non-Hispanic black rate was 2.2 times the non-Hispanic white rate.

Source: Mathews TJ, MacDorman MF. Infant mortality statistics from the 2010 period linked birth/infant death data set. Natl Vital Stat Rep 2013;62(8).

Reported by: Marian F. MacDorman, PhD, mfm1@cdc.gov, 301-458-4356; T.J. Mathews.

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

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

U.S. Government Printing Office: 2014-723-032/01039 Region IV ISSN: 0149-2195