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Great American Smokeout — November 16, 2017

The American Cancer Society's Great American Smokeout is an annual event that encourages smokers to make a plan to quit smoking (*1*). The 42nd annual Great American Smokeout will be held on November 16, 2017.

In the more than 50 years since the Surgeon General's first report on smoking and health, cigarette smoking among U.S. adults has been reduced by approximately half. Nonetheless, since 1964, the year of that first report, an estimated 20 million persons have died because of smoking. Smoking remains the leading preventable cause of disease, disability, and death in the United States (*2*).

About two out of three adult smokers want to quit smoking cigarettes, and approximately half of smokers made a quit attempt in the preceding year (*2*). However, in 2016, more than one in seven U.S. adults were current cigarette smokers (*3*). Getting effective help through counseling and use of medications can increase the chances of quitting by as much as threefold (*4*).

Information and support for quitting smoking is available by telephone at 800-QUIT-NOW (800–784–8669). CDC's Tips From Former Smokers campaign offers additional quit resources at https://www.cdc.gov/tips.

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Tobacco Product Use Among Adults — United States, 2015

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Tobacco use remains the leading cause of preventable disease and death in the United States (*1*). Despite declining cigarette smoking prevalence among U.S. adults, shifts in the tobacco product landscape have occurred in recent years (*2*,*3*). Previous estimates of tobacco product use among U.S. adults were obtained from the National Adult Tobacco Survey, which ended after the 2013–2014 cycle. This year, CDC and the Food and Drug Administration (FDA) assessed the most recent national estimates of tobacco product use among adults aged ≥18 years using, for the first time, data from the 2015 National Health Interview Survey (NHIS), an annual, nationally representative, in-person survey of the noninstitutionalized U.S. civilian population. The 2015 NHIS adult core

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questionnaire included 33,672 adults aged ≥18 years, reflecting a 55.2% response rate. Data were weighted to adjust for differences in selection probability and nonresponse, and to provide nationally representative estimates. In 2015, 20.1 % of U.S. adults currently (every day or some days) used any tobacco product, 17.6% used any combustible tobacco product, and 3.9% used ≥2 tobacco products. By product, 15.1% of adults used cigarettes; 3.5% used electronic cigarettes (e-cigarettes); 3.4% used cigars, cigarillos, or filtered little cigars; 2.3% used smokeless tobacco; and 1.2% used regular pipes, water pipes, or hookahs.* Current use of any tobacco product was higher among males; persons aged <65 years; non-Hispanic American Indian/Alaska natives (AI/AN), whites, blacks, and persons of multiple races; persons living in the Midwest; persons with a General Educational Development (GED) certificate; persons with annual household income of <$35,000; persons who were single, never married, or not living with a partner or divorced, separated, or widowed; persons who were insured through Medicaid or uninsured; persons with a disability; and persons who identified as lesbian, gay, or bisexual (LGB). Current use of any tobacco product was 47.2% among adults with serious psychological distress compared with 19.2% among those without serious psychological distress. Proven population-level interventions that focus on the diversity of tobacco product use are important to reducing tobacco-related disease and death in the United States (*1*).

Consistent with previous reports (*2*,*3*), current cigarette smokers were defined as persons who reported they had smoked ≥100 cigarettes during their lifetime, and smoked either "every day" or "some days" at the time of survey. Current users of all other assessed tobacco products were defined as persons who reported use "every day" or "some days" at the time of survey. Prevalence estimates for current use of any current tobacco product, any combustible tobacco product (cigarettes, cigars, cigarillos, filtered little cigars, pipes, water pipes, or hookahs), and use of two or more tobacco products were calculated. Estimates were assessed overall and by sex, age, race/ethnicity, U.S. Census region,† education, marital status, annual household income, sexual orientation,§ health

* Because of phrasing of the question in the 2015 NHIS, it was not possible to distinguish between regular pipe use and water pipe or hookah use in this analysis.

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

§ Sexual orientation was determined based on the question, "Which of the following best represents how you think of yourself?" with response options of "gay" ("lesbian or gay" for female respondents), "heterosexual," that is, "not gay" ("not lesbian or gay" for female respondents), "bisexual," "something else," and "I don't know the answer." Responses were considered to be "LGB" if persons responded "gay," "lesbian or gay," or "bisexual."

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insurance coverage,[¶] disability,[**] and presence of serious psychological distress.[††] Significant differences between groups were assessed using chi-squared statistics; differences presented were all statistically significant ($p<0.05$).

Among U.S. adults in 2015, 20.1% (an estimated 48.7 million) currently used any tobacco product, 17.6% (42.6 million; 87.4% of current tobacco product users) currently used any combustible tobacco product, and 3.9% (9.5 million; 19.5%) currently used ≥2 tobacco products. By product, 15.1% (36.5 million; 74.9% of current users) of adults currently used cigarettes; 3.5% (7.9 million; 16.1%) used e-cigarettes; 3.4% (7.8 million; 16.0%) used cigars, cigarillos, or filtered little cigars; 2.3% (5.1 million; 10.5%) used smokeless tobacco; and 1.2% (2.7 million; 5.5%) used pipes, water pipes, or hookahs.

Differences in tobacco product use were observed across population groups (Table). The prevalence of any current tobacco use was significantly higher among males (25.2%) than among females (15.4%) and among adults aged 25–44 years (23.3%) than among those aged ≥65 years (11.1%). Notably, the age distribution of current tobacco users varied by product type, and for pipes, water pipes, hookahs and e-cigarettes, use was highest among younger adults (Figure). By race/ethnicity, current use was higher among non-Hispanic AI/AN (26.6%), multiple races (25.4%), whites (22.6%), and blacks (20.8%), and lowest among non-Hispanic Asians (9.0%). By region, prevalence was highest among adults living in the Midwest (24.0%) and lowest among those living in the West (17.4%). Prevalence was highest among adults with a GED certificate (37.6%) and lowest among those with a graduate degree (6.9%), and was higher among adults who were single, never married, or not living with a partner (23.1%) or divorced, separated, or widowed (23.2%) than among adults who were married or living with a partner (18.2%). Prevalence of tobacco use was highest among persons with an income of <$35,000 (27.8%) and lowest among those with an annual household income of ≥$100,000 (13.4%); it was also higher among LGB adults (27.4%) than among heterosexual adults (20.1%), and among uninsured persons (32.3%) and Medicaid enrollees (31.7%) than among those covered by private health insurance (16.6%) or by Medicare only (11.4%). Adults with a disability had higher prevalence (25.8%) of tobacco use than did those reporting no disability (19.7%), and prevalence was higher among adults with serious psychological distress (47.2%) than adults without serious psychological distress (19.2%).

[¶] Private coverage: includes adults who had any comprehensive private insurance plan (including health maintenance organizations and preferred provider organizations). Medicaid: for adults aged <65 years, includes adults who do not have private coverage, but who have Medicaid or other state-sponsored health plans including Children's Health Insurance Program (CHIP); for adults aged ≥65 years, includes adults aged ≥65 years who do not have any private coverage but have Medicare and Medicaid or other state-sponsored health plans including CHIP; Medicare only: includes adults aged ≥65 years who only have Medicare coverage; Other coverage: includes adults who do not have private insurance, Medicaid, or other public coverage, but who have any type of military coverage, coverage from other government programs, or Medicare. Uninsured: includes adults who have not indicated that they are covered at the time of the interview under private health insurance, Medicare, Medicaid, CHIP, a state-sponsored health plan, other government programs, or military coverage.

[**] Disability was defined based on self-reported presence of selected limitations including vision, hearing, cognition, and movement. Limitations in performing activities of daily living were defined based on response to the question, "Does [person] have difficulty dressing or bathing?" Limitations in performing instrumental activities of daily living were defined based on response to the question, "Because of a physical, mental, or emotional condition, does [person] have difficulty doing errands alone such as visiting a doctor's office or shopping?" Any disability was defined as a "yes" response pertaining to at least one of the limitations listed (i.e., vision, hearing, cognition, movement, activities of daily living, or instrumental activities of daily living). A random sample of half of the respondents from the 2015 Person File were asked about limitations.

[††] The Kessler psychological distress scale is a series of six questions that ask about feelings of sadness, nervousness, restlessness, worthlessness, and feeling like everything is an effort in the past 30 days. Participants were asked to respond on a Likert Scale ranging from "None of the time" (score = 0) to "All of the time" (score = 4). Responses were summed over the six questions; persons with a score of ≥13 were coded as having serious psychological distress, and respondents with a score <13 were coded as not having serious psychological distress.

Discussion

In 2015, approximately one in five U.S. adults (48.7 million) currently used any tobacco product, with most using combustible tobacco products. Any tobacco product use was significantly higher among males; adults aged <65 years; non-Hispanic AI/AN, whites, blacks, and persons of multiple races; persons living in the Midwest; persons with a GED; persons with annual household income <$35,000; persons who were single/never married/not living with a partner or divorced/separated/widowed; persons who were uninsured or insured through Medicaid; persons with a disability; and persons who identified as LGB. Adults with serious psychological distress had the highest prevalence of any tobacco product use of any subpopulation.

The burden of death and disease from tobacco use is overwhelmingly caused by cigarettes and other combusted tobacco products (*1*). Cigarette smoking has been declining among U.S. adults for several decades (*1*); in more recent years, prevalence declined from 20.9% in 2005 to 15.1% in 2015 (*3*). The findings from this report show that in 2015, cigarettes remained the most commonly used tobacco product among adults, and combustible tobacco products were currently used by 17.6% of adults, or 87.4% of current any tobacco users. Despite the popularity of emerging products such as pipes, water pipes, hookahs, and e-cigarettes among youths, these findings highlight the importance of also continuing to use targeted evidence-based, population-level strategies to combat combustible product use. These strategies include tobacco price increases, high-impact antitobacco mass media campaigns,

TABLE. Percentage of persons aged ≥18 years who reported tobacco product use "every day" or "some days," by tobacco product and selected characteristics — National Health Interview Survey, United States, 2015

Characteristic	Tobacco product use, % (95% CI)							
	Any tobacco product*	Any combustible tobacco product†	Cigarettes§	Cigars/ Cigarillos/ Filtered little cigars¶	Regular pipe/ Water pipe/ Hookah**	E-cigarettes††	Smokeless tobacco§§	≥2 tobacco products¶¶
Overall	**20.1 (19.5–20.8)**	**17.6 (17.0–18.2)**	**15.1 (14.6–15.7)**	**3.4 (3.1–3.7)**	**1.2 (1.0–1.4)**	**3.5 (3.2–3.8)**	**2.3 (2.0–2.6)**	**3.9 (3.6–4.2)**
Sex								
Male	25.2 (24.2–26.3)	21.0 (20.1–22.0)	16.7 (15.9–17.6)	6.0 (5.4–6.5)	1.8 (1.5–2.2)	4.3 (3.9–4.8)	4.4 (3.9–5.0)	5.8 (5.3–6.3)
Female	15.4 (14.7–16.1)	14.4 (13.8–15.1)	13.6 (12.9–14.3)	1.1 (0.9–1.3)	0.6 (0.4–0.8)	2.6 (2.3–3.0)	0.2 (0.1–0.3)	2.2 (1.9–2.5)
Age group (yrs)								
18–24	21.4 (19.3–23.5)	17.6 (15.8–19.5)	13.0 (11.4–14.8)	4.2 (3.3–5.3)	3.4 (2.6–4.4)	5.2 (4.3–6.3)	3.2 (2.4–4.3)	5.4 (4.4–6.7)
25–44	23.3 (22.2–24.5)	20.3 (19.3–21.4)	17.7 (16.8–18.8)	3.9 (3.4–4.5)	1.3 (1.0–1.7)	4.3 (3.8–4.9)	2.7 (2.3–3.1)	4.8 (4.2–5.4)
45–64	21.6 (20.5–22.7)	19.2 (18.2–20.3)	17.0 (16.0–18.0)	3.7 (3.2–4.2)	0.5 (0.4–0.8)	3.3 (2.8–3.7)	2.1 (1.7–2.5)	3.9 (3.5–4.4)
≥65	11.1 (10.2–12.0)	9.8 (9.0–10.7)	8.4 (7.7–9.2)	1.7 (1.4–2.1)	0.6 (0.4–0.9)	1.1 (0.8–1.5)	1.2 (0.9–1.7)	1.5 (1.2–1.9)
Race/Ethnicity								
White, non-Hispanic	22.6 (21.7–23.5)	19.3 (18.5–20.1)	16.6 (15.8–17.40)	3.7 (3.3–4.1)	1.2 (1.0–1.4)	4.1 (3.7–4.6)	3.2 (2.8–3.6)	4.6 (4.2–5.1)
Black, non-Hispanic	20.8 (19.1–22.6)	19.9 (18.2–21.6)	16.7 (15.2–18.3)	4.8 (3.9–5.7)	1.4 (1.0–2.1)	1.9 (1.4–2.5)	0.7 (0.5–1.0)	3.7 (3.1–4.6)
Asian, non-Hispanic	9.0 (7.5–10.8)	8.0 (6.7–9.7)	7.0 (5.7–8.6)	0.9 (0.5–1.6)	—***	2.3 (1.4–3.6)	—***	1.5 (0.9–2.4)
American Indian/Alaska Native, non-Hispanic	26.6 (20.1–34.4)	24.8 (18.3–32.6)	21.9 (17.0–27.6)	—***	—***	—***	—***	—***
Hispanic	12.9 (11.8–14.1)	11.8 (10.8–12.9)	10.1 (9.1–11.1)	1.9 (1.5–2.5)	0.8 (0.5–1.1)	2.0 (1.5–2.5)	0.4 (0.2–0.6)	1.6 (1.3–2.0)
Non-Hispanic multirace	25.4 (21.3–29.9)	23.6 (19.6–28.1)	20.2 (16.3–24.8)	6.8 (4.4–10.3)	—***	7.1 (4.2–11.8)	—***	9.3 (6.6–13.0)
U.S. Census region†††								
Northeast	18.2 (16.7–19.9)	16.6 (15.1–18.2)	13.5 (12.3–14.9)	3.8 (2.9–4.8)	1.3 (0.9–1.9)	2.6 (1.9–3.4)	1.1 (0.7–1.6)	3.1 (2.4–4.1)
Midwest	24.0 (22.6–25.5)	21.1 (19.8–22.4)	18.7 (17.4–20.1)	3.7 (3.1–4.4)	1.1 (0.8–1.6)	3.8 (3.2–4.5)	3.1 (2.4–4.0)	4.7 (4.0–5.5)
South	20.4 (19.4–21.6)	17.5 (16.6–18.4)	15.3 (14.5–16.3)	3.3 (3.0–3.8)	0.9 (0.7–1.2)	3.5 (3.1–4.0)	2.7 (2.3–3.2)	3.9 (3.5–4.4)
West	17.4 (16.3–18.5)	15.1 (14.1–16.2)	12.4 (11.4–13.5)	3.1 (2.5–3.8)	1.5 (1.2–2.0)	3.7 (3.2–4.3)	1.6 (1.2–2.1)	3.7 (3.1–4.4)
Education (results are adults aged ≥25 yrs)								
0–12 yrs (no diploma)	27.6 (25.7–29.6)	25.0 (23.2–26.9)	24.2 (22.5–26.1)	3.0 (2.2–4.0)	1.2 (0.7–2.0)	3.3 (2.5–4.3)	2.9 (2.2–3.9)	5.0 (4.0–6.2)
GED	37.6 (33.3–42.3)	35.9 (31.7–40.3)	34.1 (30.0–38.4)	4.7 (3.2–7.0)	—***	6.3 (4.6–8.5)	2.6 (1.6–4.2)	8.5 (6.6–10.9)
High school diploma	24.4 (22.8–26.0)	21.4 (20.0–22.9)	19.8 (18.5–21.2)	3.4 (2.8–4.2)	0.6 (0.4–0.9)	3.6 (3.0–4.4)	2.8 (2.2–3.5)	4.5 (3.9–5.3)
Some college, no degree	23.8 (22.2–25.3)	20.5 (19.2–21.9)	18.5 (17.2–19.8)	3.3 (2.7–4.1)	0.7 (0.5–1.1)	4.6 (3.8–5.6)	2.2 (1.8–2.9)	4.4 (3.7–5.2)
Associate degree (academic or technical/vocational)	22.2 (20.4–24.1)	19.4 (17.8–21.2)	16.6 (15.0–18.3)	3.9 (3.1–4.9)	1.0 (0.6–1.5)	4.2 (3.3–5.2)	2.5 (1.7–3.8)	4.5 (3.5–5.8)
Undergraduate degree (BA, BS, AB, BBA)	12.6 (11.5–13.8)	10.6 (9.6–11.7)	7.4 (6.5–8.3)	3.4 (2.8–4.2)	1.2 (0.8–1.7)	2.4 (1.9–3.0)	1.5 (1.1–2.0)	2.4 (1.9–2.0)
Graduate degree (Master's, Professional, or Doctoral)	6.9 (5.9–8.0)	6.3 (5.4–7.4)	3.6 (3.0–4.5)	2.5 (1.9–3.4)	0.7 (0.4–1.1)	0.6 (0.4–1.0)	0.7 (0.4–1.2)	0.9 (0.6–1.4)
Marital status								
Married/living with partner	18.2 (17.3–19.1)	15.5 (14.8–16.3)	13.1 (12.4–13.9)	3.3 (2.9–3.7)	0.7 (0.5–0.9)	3.1 (2.8–3.5)	2.3 (2.0–2.7)	3.3 (2.9–3.7)
Divorced/Separated/ Widowed	23.2 (22.0–24.6)	21.3 (20.1–22.5)	20.0 (18.8–21.2)	2.8 (2.3–3.4)	0.8 (0.6–1.1)	3.1 (2.6–3.6)	2.1 (1.6–2.7)	4.3 (3.7–5.0)
Single/Never married/Not living with a partner	23.1 (21.8–24.6)	20.3 (19.1–21.6)	16.6 (15.4–17.9)	4.4 (3.8–5.2)	2.9 (2.3–3.6)	4.7 (4.0–5.5)	2.3 (1.8–2.9)	5.4 (4.7–6.1)
Annual household income ($)								
<35,000	27.8 (26.6–29.0)	25.4 (24.2–26.6)	23.3 (22.2–24.5)	3.8 (3.4–4.3)	1.6 (1.3–2.1)	4.6 (4.1–5.2)	2.1 (1.7–2.6)	5.8 (5.2–6.4)
35,000–74,999	21.2 (20.0–22.5)	18.6 (17.5–19.8)	16.6 (15.6–17.8)	2.9 (2.4–3.4)	1.2 (0.9–1.6)	3.5 (3.0–4.1)	2.3 (1.9–2.9)	3.9 (3.4–4.6)
75,000–99,999	18.1 (16.3–20.2)	14.7 (13.0–16.5)	11.9 (10.5–13.4)	3.7 (2.7–4.9)	—***	4.2 (3.2–5.3)	2.7 (1.9–3.8)	3.8 (2.9–5.0)
≥100,000	13.4 (12.3–14.7)	10.9 (9.8–12.1)	7.1 (6.2–8.2)	3.8 (3.1–4.5)	1.2 (0.8–1.7)	2.3 (1.8–2.8)	2.3 (1.8–2.9)	2.3 (1.8–2.9)
Sexual orientation								
Heterosexual/Straight	20.1 (19.4–20.8)	17.5 (16.9–18.1)	14.9 (14.4–15.5)	3.4 (3.1–3.7)	1.1 (0.9–1.3)	3.4 (3.1–3.7)	2.3 (2.0–2.6)	3.9 (3.6–4.3)
LGB	27.4 (23.5–31.7)	24.3 (20.5–28.4)	20.6 (17.1–24.6)	3.8 (2.4–5.8)	4.0 (2.5–6.2)	8.9 (6.5–11.9)	—***	7.6 (5.6–10.2)
Health insurance coverage§§§								
Private insurance	16.6 (15.8–17.4)	13.8 (13.1–14.6)	11.1 (10.5–11.8)	3.2 (2.9–3.6)	1.1 (0.9–1.3)	2.9 (2.6–3.3)	2.4 (2.0–2.8)	3.0 (2.7–3.4)
Medicaid	31.7 (29.8–33.7)	29.4 (27.6–31.3)	27.8 (26.0–29.7)	4.0 (3.2–4.9)	1.5 (1.0–2.2)	5.7 (4.7–6.8)	1.6 (1.1–2.4)	6.7 (5.7–7.9)
Medicare only (aged ≥65 yrs)	11.4 (9.9–13.1)	10.2 (8.8–11.8)	8.9 (7.6–10.5)	1.5 (1.0–2.1)	0.7 (0.4–1.3)	1.2 (0.8–1.9)	1.0 (0.6–1.7)	1.6 (1.1–2.4)
Other public insurance	25.4 (22.6–28.4)	21.9 (19.4–24.7)	19.0 (16.8–21.4)	4.7 (3.4–6.4)	—***	5.0 (3.9–6.4)	2.8 (2.0–4.1)	6.0 (4.8–7.5)
Uninsured	32.3 (30.1–34.5)	30.1 (28.0–32.2)	27.4 (25.5–29.4)	4.7 (3.8–5.9)	1.4 (1.0–2.1)	5.1 (4.2–6.2)	2.4 (1.8–3.3)	6.5 (5.5–7.7)

See table footnotes on the next page.

TABLE. (*Continued*) Percentage of persons aged ≥18 years who reported tobacco product use "every day" or "some days," by tobacco product and selected characteristics — National Health Interview Survey, United States, 2015

Characteristic	Tobacco product use, % (95% CI)							
	Any tobacco product*	Any combustible tobacco product†	Cigarettes§	Cigars/ Cigarillos/ Filtered little cigars¶	Regular pipe/ Water pipe/ Hookah**	E-cigarettes††	Smokeless tobacco§§	≥2 Tobacco products¶¶
Disability/Limitation¶¶¶								
Yes	25.8 (23.9–27.8)	23.4 (21.6–25.4)	22.0 (20.2–24.0)	3.7 (2.9–4.6)	1.1 (0.8–1.7)	4.9 (4.0–6.1)	1.8 (1.3–2.5)	6.2 (5.2–7.4)
No	19.7 (18.8–20.6)	17.0 (16.2–17.9)	14.4 (13.7–15.2)	3.4 (3.0–3.8)	1.1 (0.9–1.3)	3.3 (2.9–3.7)	2.3 (1.9–2.7)	3.5 (3.1–3.9)
Serious psychological distress (Kessler scale)****								
Yes	47.2 (43.4–51.2)	43.5 (39.7–47.4)	40.6 (37.0–44.3)	6.3 (4.3–9.1)	4.3 (2.5–7.2)	9.7 (7.4–12.7)	3.5 (2.1–5.6)	12.8 (10.1–16.0)
No	19.2 (18.5–19.9)	16.6 (16.0–17.2)	14.0 (13.5–14.6)	3.3 (3.0–3.6)	1.0 (0.9–1.2)	3.2 (2.9–3.5)	2.2 (1.9–2.5)	3.7 (3.5–4.1)

Abbreviations: CI = confidence interval; E-cigarettes = electronic cigarettes; GED = General Education Development certificate; HS = high school; LGB = lesbian, gay, or bisexual.

* Any tobacco use was defined as use either "every day" or "some days" of at least one tobacco product among individuals (for cigarettes, users were defined as persons who reported use either "every day" or "some days" and had smoked ≥100 cigarettes during their lifetime).

† Any combustible tobacco use was defined as use either "every day" or "some days" of at least one combustible tobacco product: cigarettes; cigars, cigarillos, filtered little cigars; pipes, water pipes, or hookah (for cigarettes, users were defined as persons who reported use either "every day" or "some days" and had smoked ≥100 cigarette during their lifetime).

§ Current cigarette smokers were defined as persons who reported smoking ≥100 cigarettes during their lifetime and now smoked cigarettes "every day" or "some days."

¶ Reported smoking cigars, cigarillos, or little filtered cigars at least once during their lifetime and now smoked at least one of these products "every day" or "some days."

** Reported smoking tobacco in a regular pipe, water pipe, or hookah at least once during their lifetime and now smoked at least one of these products "every day" or "some days."

†† Reported using electronic cigarettes at least once during their lifetime and now used e-cigarettes "every day" or "some days."

§§ Reported using chewing tobacco, snuff, dip, snus, or dissolvable tobacco at least once during their lifetime and now used at least one of these products "every day" or "some days."

¶¶ Use was defined as use either "every day" or "some days" for at least two or more of the following tobacco products: cigarettes (≥100 cigarettes during lifetime); cigars, cigarillos, filtered little cigars; pipes, water pipes, or hookah; electronic cigarettes; or smokeless tobacco products.

*** Prevalence estimates with a relative standard error ≥30% are not presented.

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

§§§ Private coverage: includes adults who had any comprehensive private insurance plan (including health maintenance organizations and preferred provider organizations). *Medicaid*: For adults aged <65 years, includes adults who do not have private coverage, but who have Medicaid or other state-sponsored health plans including Children's Health Insurance Program (CHIP); for adults aged ≥65 years, includes adults aged ≥65 years who do not have any private coverage but have Medicare and Medicaid or other state-sponsored health plans including CHIP. *Medicare only*: includes adults aged ≥65 years who only have Medicare coverage. *Other coverage*: includes adults who do not have private insurance, Medicaid, or other public coverage, but who have any type of military coverage, coverage from other government programs, or Medicare. *Uninsured*: includes adults who have not indicated that they are covered at the time of the interview under private health insurance, Medicare, Medicaid, CHIP, a state-sponsored health plan, other government programs, or military coverage. Insurance coverage is "as of time of survey."

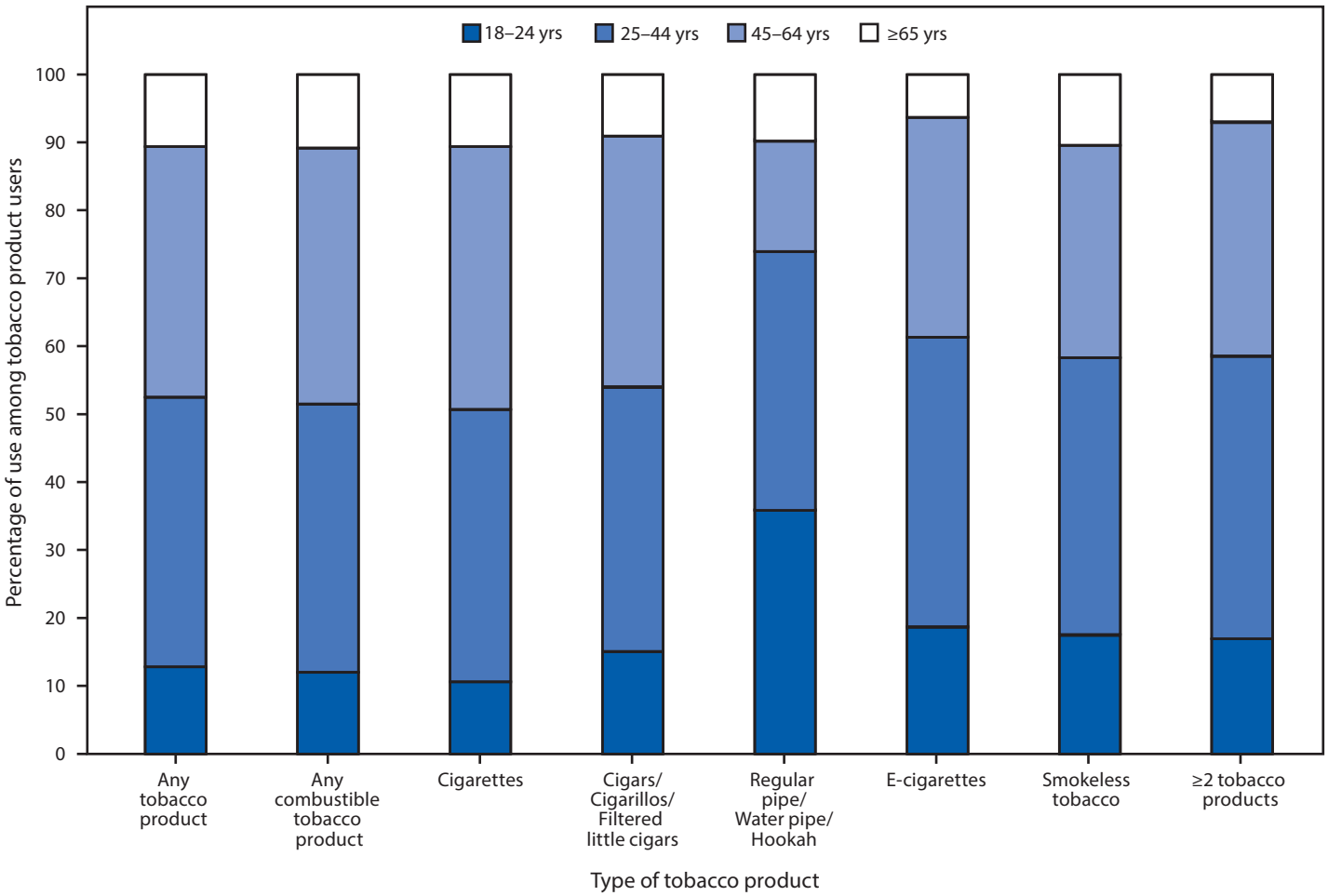
¶¶¶ Disability was defined based on self-reported presence of selected limitations including vision, hearing, cognition, and movement. Limitations in performing activities of daily living were defined based on response to the question, "Does [person] have difficulty dressing or bathing?" Limitations in performing instrumental activities of daily living were defined based on response to the question, "Because of a physical, mental, or emotional condition, does [person] have difficulty doing errands alone such as visiting a doctor's office or shopping?" Any disability was defined as a "yes" response pertaining to at least one of the limitations listed (i.e., vision, hearing, cognition, movement, activities of daily living, or instrumental activities of daily living). A random sample of half of the respondents from the 2015 Person File were asked about limitations.

**** The Kessler psychological distress scale is a series of six questions that ask about feelings of sadness, nervousness, restlessness, worthlessness, and feeling like everything is an effort in the past 30 days. Participants were asked to respond on a Likert Scale ranging from "None of the time" (score = 0) to "All of the time" (score = 4). Responses were summed over the six questions; persons with a score of ≥13 were coded as having serious psychological distress, and respondents with a score <13 were coded as not having serious psychological distress.

comprehensive smoke-free laws, and enhanced access to help quitting tobacco to reduce smoking-related death and disease in the United States (*1*).

Observed disparities in tobacco product use across population groups likely have multiple contributing factors. For example, disparities in tobacco use by race/ethnicity might be partly explained by socio-cultural influences, norms surrounding the acceptability of tobacco use, and targeted marketing (*1*,*4*). Differences by education might be partly attributable to variations in understanding of the range of health hazards caused by tobacco product use (*1*,*4*). Differences by health insurance coverage and income might be attributable in part to variations in tobacco cessation coverage across insurance types and access to evidence-based cessation treatments, respectively (*1*,*5*). Furthermore, the higher prevalence of current tobacco product use among persons who identified as LGB might be due, in part, to social stressors including stigma and discrimination, in addition to targeted marketing efforts by the tobacco industry (*1*,*6*). Similarly, the higher rates of pipe, water pipe, hookah, and e-cigarette use among younger adults could be due to the manner in which these products are marketed and used socially (*1*,*7*). The tobacco industry has targeted marketing

FIGURE. Percentage of use of tobacco product types* among adults aged ≥18 years who reported using tobacco products "every day" or "some days," by age group — National Health Interview Survey, United States, 2015



* For cigarettes, users were defined as persons who reported use either "every day" or "some days" and had smoked ≥100 cigarettes during their lifetime.

toward minority communities, persons of lower socioeconomic status, and younger persons (*4*,*6*). Lastly, the high prevalence of tobacco use among persons with serious psychological distress possibly reflects nicotine's stimulant or relaxation effects, nicotine's effects on drug metabolism, misperceptions about quitting smoking and abstinence success, and allowing smoking in mental health facilities (*4*,*8*).

The findings in this report are subject to at least three limitations. First, tobacco use estimates were self-reported and not validated by biochemical tests. However, previous studies have shown that self-reported tobacco product use is highly correlated with serum cotinine levels (*9*,*10*). Second, the NHIS response rate (55.2%) could introduce nonresponse bias if respondents and nonrespondents systematically differ in ways not accounted for in the development of the weights. Finally, NHIS does not include institutionalized populations and persons in the military, so the results are not generalizable to those groups.

Sustained, comprehensive state tobacco control programs can accelerate progress toward reducing tobacco-related diseases and deaths.[§§] Full implementation of comprehensive tobacco control programs, in conjunction with FDA regulation of tobacco products, across the spectrum of tobacco products, are vital (*1*). Targeted interventions are also warranted to reach subpopulations with the greatest burden of use, which might vary by tobacco product type.

[§§] https://www.cdc.gov/tobacco/stateandcommunity/best_practices/pdfs/2014/comprehensive.pdf.

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Andrea Gentzke, PhD, Office on Smoking and Health, CDC.

Summary

What is already known about this topic?

Tobacco use continues to be the leading cause of preventable disease and death in the United States. Despite declining cigarette smoking prevalence among U.S. adults, notable shifts in the tobacco product landscape have occurred in recent years.

What is added by this report?

In 2015, 20.1% of U.S. adults currently (every day or some days) used any tobacco product, 17.6% used any combustible tobacco product, and 3.9% used ≥2 tobacco products. Current use of any tobacco product was higher among males; persons aged <65 years; non-Hispanic American Indian/Alaska natives, whites, blacks, and persons of multiple races; persons living in the Midwest; persons with a General Educational Development certificate; persons with annual household income <$35,000; persons who were single/never married/not living with a partner or divorced/separated/widowed; persons who were insured through Medicaid or uninsured; persons with a disability; and persons who identified as lesbian, gay, or bisexual. Current use of any tobacco product was 47.2% among adults with serious psychological distress compared with 19.2% among those without serious psychological distress.

What are the implications for public health practice?

Full implementation of comprehensive tobacco control programs, in conjunction with FDA regulation of tobacco products, are vital across the spectrum of tobacco products. Targeted interventions are also warranted to reach subpopulations with the greatest burden of use, which might vary by tobacco product type.

Conflict of Interest

No conflicts of interest were reported.

[1]Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, CDC; [2]Epidemic Intelligence Service, CDC; [3]Center for Tobacco Products, Food and Drug Administration.

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Surveillance for Waterborne Disease Outbreaks Associated with Drinking Water — United States, 2013–2014

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Provision of safe water in the United States is vital to protecting public health (*1*). Public health agencies in the U.S. states and territories* report information on waterborne disease outbreaks to CDC through the National Outbreak Reporting System (NORS) (https://www.cdc.gov/healthywater/surveillance/index.html). During 2013–2014, 42 drinking water–associated† outbreaks were reported, accounting for at least 1,006 cases of illness, 124 hospitalizations, and 13 deaths. *Legionella* was associated with 57% of these outbreaks and all of the deaths. Sixty-nine percent of the reported illnesses occurred in four outbreaks in which the etiology was determined to be either a chemical or toxin or the parasite *Cryptosporidium.* Drinking water contamination events can cause disruptions in water service, large impacts on public health, and persistent community concern about drinking water quality. Effective water treatment and regulations can protect public drinking water supplies in the United States, and rapid detection, identification of the cause, and response to illness reports can reduce the transmission of infectious pathogens and harmful chemicals and toxins.

To provide information about drinking water–associated waterborne disease outbreaks in the United States in which the first illness occurred in 2013 or 2014 (https://www.cdc.gov/healthywater/surveillance/drinking-surveillance-reports.html), CDC analyzed outbreaks reported to the CDC Waterborne Disease and Outbreak Surveillance System through NORS (https://www.cdc.gov/nors/about.html) as of December 31, 2015. For an event to be defined as a waterborne disease outbreak, two or more cases must be linked epidemiologically by time, location of water exposure, and illness characteristics; and the epidemiologic evidence must implicate water exposure as the probable source of illness. Data requested for each outbreak include 1) the number of cases, hospitalizations, and deaths; 2) the etiologic agent (confirmed or suspected); 3) the implicated water system; 4) the setting of exposure; and 5) relevant epidemiologic and environmental data needed to understand the outbreak occurrences and for determining the deficiency classification.§ One previously unreported outbreak with onset date of first illness in 2012 is presented but is not included in the analysis of outbreaks that occurred during 2013–2014.

Public health officials from 19 states reported 42 outbreaks associated with drinking water during the surveillance period (Table 1) (https://www.cdc.gov/healthywater/surveillance/drinking-water-tables-figures.html). These outbreaks resulted in at least 1,006 cases of illness, 124 hospitalizations (12% of cases), and 13 deaths. At least one etiologic agent was identified in 41 (98%) outbreaks. Counts of etiologic agents in this report include both confirmed and suspected etiologies, which differs from previous surveillance reports. *Legionella* was implicated in 24 (57%) outbreaks, 130 (13%) cases, 109 (88%) hospitalizations, and all 13 deaths (Table 1). Eight outbreaks caused by two parasites resulted in 289 (29%) cases, among which 279 (97%) were caused by *Cryptosporidium*, and 10 (3%) were caused by *Giardia duodenalis*. Chemicals or toxins were implicated in four outbreaks involving 499 cases, with 13 hospitalizations, including the first reported outbreaks (two outbreaks) associated with algal toxins in drinking water.

The most commonly reported outbreak etiology was *Legionella* (57%), making acute respiratory illness the most common predominant illness type reported in outbreaks (Table 2). Thirty-five (83%) outbreaks were associated with public (i.e., regulated), community or noncommunity water systems,¶ and three (7%) were associated with unregulated,

* Outbreak reports can be submitted by public health agencies in the U.S states, District of Columbia, Guam, Puerto Rico, Marshall Islands, Federated States of Micronesia, Northern Mariana Islands, Palau, and U.S. Virgin Islands.

† Drinking water, also called potable water, is water for human consumption (e.g., drinking, bathing, showering, hand-washing, teeth brushing, food preparation, dishwashing, and maintaining oral hygiene) and includes water collected, treated, stored, or distributed in public and individual water systems, as well as bottled water.

§ Waterborne disease outbreaks are assigned one or more deficiency classifications based on available data. The deficiencies provide information regarding how the water became contaminated, characteristics of the water system, and factors leading to waterborne disease outbreaks. Outbreaks are assigned one or more deficiency classifications based on available data. https://www.cdc.gov/healthywater/surveillance/deficiency-classification.html.

¶ Community and noncommunity water systems are public water systems that have ≥15 service connections or serve an average of ≥25 residents for ≥60 days per year. A community water system serves year-round residents of a community, subdivision, or mobile home park. A noncommunity water system serves an institution, industry, camp, park, hotel, or business and can be nontransient or transient. Nontransient systems serve ≥25 of the same persons for ≥6 months of the year but not year-round (e.g., factories and schools) whereas transient systems provide water to places in which persons do not remain for long periods of time (e.g., restaurants, highway rest stations, and parks). Individual water systems are small systems not owned or operated by a water utility that have <15 connections or serve <25 persons.

TABLE 1. Waterborne disease outbreaks associated with drinking water (N = 42), by state/jurisdiction and month of first case onset — Waterborne Disease and Outbreak Surveillance System, United States, 2013–2014

State/ Jurisdiction	Month	Year	Etiology*	Predominant illness†	No. of cases	No. of hospitalizations§	No. of deaths¶	Type of water system**	Water source	Setting
Alaska	Aug	2014	*Giardia duodenalis*††	AGI	5	0	0	Community	River/Stream	Community/Municipality
Arizona	Jan	2014	Norovirus (S)	AGI	4	0	0	Transient, noncommunity	Unknown	Camp/Cabin Setting
Florida	Sep	2013	*L. pneumophila* serogroup 1	ARI	4	4	0	Community	Well	Hospital/Health care
Florida	Nov	2013	*L. pneumophila* serogroup 1	ARI	4	4	0	Community	Other	Other§§
Florida	Apr	2014	*L. pneumophila* serogroup 1	ARI	2	2	0	Community	Well	Hotel/Motel/Lodge/Inn
Florida	Jun	2014	*L. pneumophila* serogroup 1	ARI	3	2	0	Community	Unknown	Long-term care facility
Florida	Aug	2014	*L. pneumophila* serogroup 1	ARI	6	4	0	Community	Unknown	Hotel/Motel/Lodge/Inn
Idaho	Sep	2014	*Giardia duodenalis*	AGI	2	0	0	Unknown	Unknown	Hotel/Motel/Lodge/Inn
Indiana	Jul	2013	*Cryptosporidium* sp.	AGI	7	0	0	Community	Unknown	Mobile home park
Indiana	Nov	2014	Unknown	AGI	3	0	0	Community	Unknown	Apartment/Condo
Kansas	June	2014	*L. pneumophila* serogroup 1	ARI	2	2	0	Community	Unknown	Hospital/Health care
Maryland	Nov	2012	*L. pneumophila* serogroup 1	ARI	2¶¶	2¶¶	0	Community	Well	Hotel/Motel/Lodge/Inn
Maryland	Feb	2013	Nitrite***	AGI, Neuro	14		0	Community	Lake/Reservoir/ Impoundment	Indoor workplace/Office
Maryland	Apr	2014	*L. pneumophila* serogroup 1	ARI	2	2	0	Community	Lake/Reservoir/ Impoundment	Apartment/Condo
Maryland	Jul	2014	*L. pneumophila* serogroup 1	ARI	2	1	0	Community	Well	Hotel/Motel/Lodge/Inn
Maryland	Aug	2014	*L. pneumophila* serogroup 1	ARI	2	2	0	Community	River/Stream	Prison/Jail (Juvenile/Adult)
Michigan	Jun	2014	*L. pneumophila* serogroup 1	ARI	45	45	7	Community	River/Stream	Hospital/Health care, Community/ Municipality†††
Montana	Jul	2014	Norovirus GII.Pe-GII.4 Sydney	AGI	62	0	0	Transient, noncommunity	Well	Hotel/Motel/Lodge/Inn
New York	Jul	2013	*L. pneumophila* serogroup 1	ARI	2	2	0	Community	Lake/Reservoir/ Impoundment	Hospital/Health care
New York	Jun	2014	*L. pneumophila* serogroup 1	ARI	2	2	0	Community	Well	Hospital/Health care
North Carolina	Dec	2013	*L. pneumophila* serogroup 1	ARI	3	2	0	Community	Unknown	Long-term care facility
North Carolina	Dec	2013	*L. pneumophila* serogroup 1	ARI	7	3	0	Community	Unknown	Long-term care facility
North Carolina	May	2014	*L. pneumophila* serogroup 1	ARI	7	6	1	Community	Other	Long-term care facility
North Carolina	Jun	2014	*L. pneumophila* serogroup 1	ARI	3	3	0	Community	Unknown	Long-term care facility
North Carolina	Jul	2014	*L. pneumophila* serogroup 1	ARI	3	2	1	Community	Unreported	Long-term care facility
Ohio	Apr	2013	*L. pneumophila*	ARI	2	2	1	Unknown	Unknown	Long-term care facility
Ohio§§§	Sep	2013	Cyanobacterial toxin¶¶¶	AGI	6	0	0	Community	Lake/Reservoir/ Impoundment	Community/Municipality
Ohio	Jul	2014	*L. pneumophila* serogroup 1	ARI	14	4	0	Community	River/Stream	Long-term care facility
Ohio	Aug	2014	Cyanobacterial toxin¶¶¶	AGI	110			Community	Lake/Reservoir/ Impoundment	Community/Municipality
Ohio	Oct	2014	*Cryptosporidium* sp. (S)****	AGI	100	0	0	Individual	River/Stream	Farm/Agricultural setting
Ohio	Dec	2014	Viral, unknown (S)	AGI	2	0	0	Commercially bottled	Unknown	Private residence
Oregon	Jun	2013	*Cryptosporidium parvum* IIaA15G2R1	AGI	119	2	0	Community	Lake/Reservoir/ Impoundment	Community/Municipality
Oregon	Sep	2014	*L. pneumophila* serogroup 1	ARI	4	4	1	Community	Well	Apartment/Condo
Pennsylvania	Dec	2013	*L. pneumophila* serogroup 1	ARI	2	2	0	Unknown	Unknown	Hospital/Health care
Pennsylvania	Feb	2014	*L. pneumophila* serogroup 1	ARI	5	5	0	Community	River/Stream	Long-term care facility
Pennsylvania	Oct	2014	*L. pneumophila*	ARI	2	2	1	Community	Unknown	Long-term care facility
Rhode Island	Apr	2013	*L. pneumophila* serogroup 1	ARI	2	2	1	Community	Lake/Reservoir/ Impoundment	Hospital/Health care

See table footnotes on the next page.

TABLE 1. (*Continued*) Waterborne disease outbreaks associated with drinking water (N = 42), by state/jurisdiction and month of first case onset — Waterborne Disease and Outbreak Surveillance System, United States, 2013–2014

State/ Jurisdiction	Month	Year	Etiology*	Predominant illness†	No. of cases	No. of hospitalizations§	No. of deaths¶	Type of water system**	Water source	Setting
Tennessee	Jul	2013	*Cryptosporidium parvum*	AGI	34	0	0	Transient, noncommunity††††	Spring	Camp/Cabin setting
Tennessee	Jun	2014	*Clostridium difficile* (S); *Escherichia coli*, Enteropathogenic (S)	AGI	12	0	0	Nontransient, noncommunity	Well	Camp/Cabin setting; Community/Municipality
Virginia	Jun	2013	*Cryptosporidium* sp.	AGI	19	0	0	Individual	Well	Farm/Agricultural setting
West Virginia	Jan	2014	4-Methylcyclo hexanemethanol (MCHM)§§§§	AGI	369	13	0	Community	River/Stream	Community/Municipality
Wisconsin	Aug	2014	*Giardia duodenalis*	AGI	3	0	0	Nontransient, noncommunity	Other	National forest
Wisconsin	Sep	2014	*Campylobacter jejuni*	AGI	5	0	0	Individual	Well	Private residence

Abbreviations: AGI = acute gastrointestinal illness; ARI = acute respiratory illness; *L. pneumophila* = *Legionella pneumophila*; Neuro = neurologic illnesses, conditions, or symptoms (e.g., meningitis); S = suspected.

* Etiologies listed are confirmed, unless indicated as suspected. For multiple-etiology outbreaks, etiologies are listed in alphabetical order.

† The category of illness reported by ≥50% of ill respondents. All legionellosis outbreaks were categorized as ARI.

§ Value was set to "missing" in reports where zero hospitalizations were reported and the number of persons for whom information was available was also zero or for instances where reports are missing hospitalization data.

¶ Value was set to "missing" in reports where zero deaths were reported and the number of persons for whom information was available was also zero or for instances where reports are missing data on associated deaths.

** Community and noncommunity water systems are public water systems that have ≥15 service connections or serve an average of ≥25 residents for ≥60 days per year. A community water system serves year-round residents of a community, subdivision, or mobile home park. A noncommunity water system serves an institution, industry, camp, park, hotel, or business and can be nontransient or transient. Nontransient systems serve ≥25 of the same persons for ≥6 months of the year but not year-round (e.g., factories and schools) whereas transient systems provide water to places in which persons do not remain for long periods of time (e.g., restaurants, highway rest stations, and parks). Individual water systems are small systems not owned or operated by a water utility that have <15 connections or serve <25 persons.

†† Classification of all reported *Giardia* cases has changed from *Giardia intestinalis* to *Giardia duodenalis* to align with laboratory standards.

§§ Setting is listed as "other" because implicated facility houses both independent living and assisted living facilities.

¶¶ This count was not included in the analysis of the current report. This outbreak occurred in 2012 and was not reported in the previous drinking water outbreak report.

*** Patients' methemoglobin levels ranged from 1.6% to 32.3%. Water was determined to be the source rather than food because all cases had direct exposure to water. Of the 14 cases, five used the water to make oatmeal or cream of wheat.

††† This report includes both community and hospital-associated cases (27 of 45 patients reported health care/hospital exposure).

§§§ This is the first drinking water–associated outbreak of this etiology reported to the National Outbreak Reporting System.

¶¶¶ Microcystin was detected in finished water sampled from a community water system; levels exceeded state thresholds and resulted in a "Do not drink" advisory.

**** *Cryptosporidium* was detected in water samples but not in any clinical specimens.

†††† This system was registered as a community system as a result of the outbreak investigation.

§§§§ Illnesses were associated with exposure to 4-methylcyclohexanemethanol following a documented industrial spill into water supplying a public water system. However, individual levels of exposure could not be quantified in clinical specimens. Propylene glycol phenyl ether was also present in the spill at low concentrations.

individual systems. Fourteen outbreaks occurred in drinking water systems with groundwater sources and an additional 14 occurred in drinking water systems with surface water sources. The most commonly cited deficiency, which led to 24** (57%) of the 42 drinking water–associated outbreaks, was the presence of *Legionella* in drinking water systems. In addition, 143 (14%) cases were associated with seven (17%) outbreak reports that had a deficiency classification indicating "unknown or insufficient information."

Among 1,006 cases attributed to drinking water–associated outbreaks, 50% of the reported cases were associated with chemical or toxin exposure, 29% were caused by parasitic infection (either *Cryptosporidium* or *Giardia*), and 13% were caused by *Legionella* infection (Table 2). Seventy-five percent of cases were linked to community water systems. Outbreaks in water systems supplied solely by surface water accounted for most cases (79%). Of the 1,006 cases, 86% originated from outbreaks in which the predominant illness was acute gastrointestinal illness. Three (7%) outbreaks in which treatment was not expected to remove the contaminant were associated with a chemical or toxin and resulted in 48% of all outbreak-associated cases.

Discussion

Water treatment processes, regulations, and rapid response to illness outbreaks continue to reduce the transmission of pathogens, reduce exposure to chemicals and toxins, and protect the public drinking water supplies in the United States. Outbreaks reported during this surveillance period include the first reports of drinking water–associated outbreaks caused by harmful algal blooms as well as the continued challenges of preventing and controlling illnesses and outbreaks caused by *Legionella* and *Cryptosporidium*. Outbreaks in community water systems caused by chemical spills (West Virginia) (*2*), harmful algal blooms (Ohio), *Cryptosporidium* (Oregon) (*3*), and *Legionella* (Michigan) demonstrated that diverse contaminants can cause

** One of the 24 outbreaks included both deficiencies 5a and 7 under the "multiple" classification.

TABLE 2. Rank order (most common to least common) of etiology, water system, water source, predominant illness, and deficiencies associated with 42 drinking water outbreaks and 1,006 outbreak-related cases of illness — United States, 2013–2014

	Outbreaks (N = 42)		Cases (N = 1,006)	
Characteristic/Rank	**Category**	**No. (%)**	**Category**	**No. (%)**
Etiology				
1	Bacteria, *Legionella*	24 (57.1)	Chemical/Toxin	499 (49.6)
2	Parasites	8 (19.1)	Parasites	289 (28.7)
3	Chemical/Toxin	4 (9.5)	Bacteria, *Legionella*	130 (12.9)
4	Viruses	3 (7.1)	Viruses	68 (6.8)
5	Bacteria, non-*Legionella*	1 (2.4)	Multiple bacteria	12 (1.2)
6	Multiple bacteria	1 (2.4)	Bacteria, non-*Legionella*	5 (0.5)
7	Unknown	1 (2.4)	Unknown	3 (0.3)
Water system*				
1	Community	30 (71.4)	Community	759 (75.4)
2	Noncommunity	5 (11.9)	Individual	124 (12.3)
3	Individual	3 (7.1)	Noncommunity	115 (11.4)
4	Unknown	3 (7.1)	Unknown	6 (0.6)
5	Bottled	1 (2.4)	Bottled	2 (0.2)
Water source				
1	Ground water	14 (33.3)	Surface water	795 (79.0)
2	Surface water	14 (33.3)	Ground water	157 (15.6)
3	Unknown	12 (28.6)	Unknown	39 (3.9)
4	Mixed†	1 (2.4)	Mixed	12 (1.2)
5	Unreported	1 (2.4)	Unreported	3 (0.3)
Predominant illness§				
1	ARI	24 (57.1)	AGI	862 (85.7)
2	AGI	17 (40.5)	ARI	130 (12.9)
3	AGI; Neuro	1 (2.4)	AGI; Neuro	14 (1.4)
Deficiency¶				
1	*Legionella* spp. in drinking water system**	23 (54.8)	Treatment not expected to remove contaminant	485 (48.2)
2	Unknown/Insufficient information††	7 (16.7)	Unknown/Insufficient information	143 (14.2)
3	Multiple§§	3 (7.1)	*Legionella* spp. in drinking water system	126 (12.5)
4	Treatment not expected to remove contaminant¶¶	3 (7.1)	Treatment deficiency	119 (11.8)
5	Untreated ground water***	3 (7.1)	Untreated ground water	70 (7.0)
6	Distribution system†††	1 (2.4)	Multiple	42 (4.2)
7	Premises plumbing system§§§	1 (2.4)	Premise plumbing system	14 (1.4)
8	Treatment deficiency¶¶¶	1 (2.4)	Distribution system	7 (0.7)

Abbreviations: AGI = acute gastrointestinal illness; ARI = acute respiratory illness; Neuro = neurologic illnesses, conditions, or symptoms (e.g., meningitis).

* Community and noncommunity water systems are public water systems that have ≥15 service connections or serve an average of ≥25 residents for ≥60 days per year. A community water system serves year-round residents of a community, subdivision, or mobile home park. A noncommunity water system serves an institution, industry, camp, park, hotel, or business and can be nontransient or transient. Nontransient systems serve ≥25 of the same persons for ≥6 months of the year but not year-round (e.g., factories and schools) whereas transient systems provide water to places in which persons do not remain for long periods of time (e.g., restaurants, highway rest stations, and parks). Individual water systems are small systems not owned or operated by a water utility that have <15 connections or serve <25 persons.

† Includes outbreaks with mixed water sources (i.e., ground water and surface water).

§ The category of illness reported by ≥50% of ill respondents; all legionellosis outbreaks were categorized as ARI.

¶ Outbreaks are assigned one or more deficiency classifications. https://www.cdc.gov/healthywater/surveillance/deficiency-classification.html.

** Deficiency 5A. Drinking water, contamination of water at points not under the jurisdiction of a water utility or at the point of use: *Legionella* spp. in water system, drinking water.

†† Deficiency 99. Unknown/Insufficient information.

§§ Multiple deficiency classifications were assigned to three outbreaks. One outbreak had deficiency 2, 3 one had 3, 4, and one had 5a, 7 (deficiency in building/home-specific water treatment after the water meter or property line).

¶¶ Deficiency 13a. Current treatment processes not expected to remove a chemical contaminant: ground water.

*** Deficiency 2. Drinking water, contamination of water at/in the water source, treatment facility, or distribution system: untreated ground water.

††† Deficiency 4. Drinking water, contamination of water at/in the water source, treatment facility, or distribution system: Distribution system deficiency, including storage (e.g., cross-connection, backflow, and contamination of water mains during construction or repair).

§§§ Deficiency 6. Drinking water, contamination of water at points not under the jurisdiction of a water utility or at the point of use; plumbing system deficiency after the water meter or property line (e.g., cross-connection, backflow, or corrosion products).

¶¶¶ Deficiency 3. Treatment deficiency (e.g., temporary interruption of disinfection, chronically inadequate disinfection, or inadequate or no filtration).

interruptions in water service, illnesses, and persistent community concern about drinking water quality. Outbreaks in community water systems can trigger large and complex public health responses because of their potential for causing communitywide illness and decreasing the availability of safe water for community members, businesses, and critical services (e.g., hospitals). These outbreaks highlight the importance of public health and water utility preparedness for emergencies related to contamination from pathogens, chemicals, and toxins.

Legionella continues to be the most frequently reported etiology among drinking water–associated outbreaks (*4*). All of the outbreak-associated deaths reported during this surveillance period as well as all of the outbreaks reported in hospital/health care settings or long-term care facilities, were caused by *Legionella*. A review of 27 Legionnaires' disease outbreak investigations in which CDC participated during 2000–2014 identified at least one water system maintenance deficiency in all 23 investigations for which this information was available, indicating that effective water management programs in buildings at increased risk for *Legionella* growth and transmission (e.g., those with more than 10 stories or that house susceptible populations) can reduce the risk for Legionnaires' disease (*5*,*6*). Although *Legionella* was detected in drinking water, multiple routes of transmission beyond ingestion of contaminated water more likely contributed to these outbreaks, such as aerosolization from domestic or environmental sources. *Cryptosporidium* was the second most common cause of both outbreaks and illnesses, demonstrating the continued threat from this chlorine-tolerant pathogen when drinking water supplies are contaminated. Existing drinking water regulations and filtration systems targeted to control *Cryptosporidium* help protect public health in community water systems that are primarily served by surface water sources or groundwater sources under the influence of surface water (*7*). Through the Epidemiology and Laboratory Capacity for Infectious Diseases (ELC) Cooperative Agreement, CDC has recently begun a laboratory-based cryptosporidiosis surveillance system in the United States, CryptoNet, to better track *Cryptosporidium* transmission and rapidly identify outbreak sources through molecular typing (*8*). The cyanobacterial toxin microcystin caused the largest reported toxin contamination of community drinking water in August 2013 and September 2014 and was responsible for extensive community and water disruptions. In June 2015, the Environmental Protection Agency released specific health advisory guidance for microcystin concentrations in drinking water (*9*). The contamination of a community drinking water supply with 4-metholcyclohexanementanol (MCHM) also illustrates the importance of source water protection from chemicals and toxins (*2*).

The findings in this report are subject to at least three limitations. First, 17% of drinking water–associated outbreak reports could not be assigned a specific deficiency classification other than "unknown or insufficient information," because of a lack of information. Furthermore, the deficiency classification most frequently reported ("presence of *Legionella* in drinking water systems") does not provide insight into the specific factors contributing to *Legionella* amplification and transmission. Second, the detection and investigation of outbreaks might be incomplete. Because of universal exposure to water, linking illness to drinking water is inherently difficult through traditional outbreak investigation methods (e.g., case-control and cohort studies) (*10*). Finally, reporting capabilities and requirements vary among states and localities. Therefore, outbreak surveillance data likely underestimate actual occurrence of outbreaks and should not be used to estimate the actual number of outbreaks or cases of waterborne disease.

Public health surveillance is necessary to detect waterborne disease and outbreaks, and to continue to monitor health trends associated with drinking water exposure. Despite resource constraints, 19 states reported drinking water–associated outbreaks for 2013–2014 compared with 14 for the previous reporting period (*4*). In this reporting cycle, more reported outbreaks and cases were caused by parasites and chemicals than by non-*Legionella* bacteria, and more cases were reported from community systems than from individual systems. Most of the outbreaks and illnesses reported in this period were in community systems, which serve larger numbers of persons; outbreaks in these systems can sicken entire communities. Although individual, private water systems likely serve fewer persons than community systems, they can still result in relatively large numbers of illnesses. One outbreak reported during 2013–2014 in an individual system led to 100 estimated illnesses associated with a wedding. The public health challenges highlighted here underscore the need for rapid detection, identification of the cause, and response when drinking water is contaminated by infectious pathogens, chemicals, or toxins to prevent and control waterborne illness and outbreaks.

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Conflict of Interest

No conflicts of interest were reported.

Summary

What is already known about this topic?

Waterborne disease and outbreaks associated with drinking water continue to occur in the United States. CDC collects data on waterborne disease outbreaks submitted from all states and territories through the National Outbreak Reporting System.

What is added by this report?

During 2013–2014, a total of 42 drinking water–associated outbreaks were reported to CDC, resulting in at least 1,006 cases of illness, 124 hospitalizations, and 13 deaths. *Legionella* was responsible for 57% of outbreaks and 13% of illnesses, and chemicals/toxins and parasites together accounted for 29% of outbreaks and 79% of illnesses. Eight outbreaks caused by parasites resulted in 289 (29%) cases, among which 279 (97%) were caused by *Cryptosporidium* and 10 (3%) were caused by *Giardia duodenalis*. Chemicals or toxins were implicated in four outbreaks involving 499 cases, with 13 hospitalizations, including the first outbreaks associated with algal toxins.

What are the implications for public health practice?

Continued public health surveillance is necessary to detect waterborne disease and monitor health trends associated with drinking water exposure. When drinking water is contaminated by infectious pathogens, chemicals, or toxins, public health agencies need to provide rapid detection, identification of the cause, and response to prevent and control waterborne illness and outbreaks. Effective water management programs in buildings at increased risk for *Legionella* growth and transmission can reduce the risk for disease from drinking water pathogens.

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Waterborne Disease Outbreaks Associated With Environmental and Undetermined Exposures to Water — United States, 2013–2014

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Waterborne disease outbreaks in the United States are associated with a wide variety of water exposures and are reported annually to CDC on a voluntary basis by state and territorial health departments through the National Outbreak Reporting System (NORS). A majority of outbreaks arise from exposure to drinking water (*1*) or recreational water (*2*), whereas others are caused by an environmental exposure to water or an undetermined exposure to water. During 2013–2014, 15 outbreaks associated with an environmental exposure to water and 12 outbreaks with an undetermined exposure to water were reported, resulting in at least 289 cases of illness, 108 hospitalizations, and 17 deaths. *Legionella* was responsible for 63% of the outbreaks, 94% of hospitalizations, and all deaths. Outbreaks were also caused by *Cryptosporidium*, *Pseudomonas*, and *Giardia*, including six outbreaks of giardiasis caused by ingestion of water from a river, stream, or spring. Water management programs can effectively prevent outbreaks caused by environmental exposure to water from human-made water systems, while proper point-of-use treatment of water can prevent outbreaks caused by ingestion of water from natural water systems.

CDC analyzed data from waterborne disease outbreaks reported to NORS associated with environmental and undetermined exposures to water during 2013–2014. Outbreaks with an environmental exposure to water are not associated with a recreational water venue or drinking water system, but rather, are linked to other water types including water from cooling towers, industrial processes, agricultural processes, occupational settings, decorative or display settings (e.g., decorative fountains), and water consumed from natural sources such as backcountry streams (*3*). Outbreaks involving an undetermined exposure to water could not be definitively linked to a single type of water exposure because of association with multiple suspected or confirmed water types (e.g., both spa and drinking water systems) or because insufficient epidemiologic, laboratory, or environmental evidence was available to identify the exposure. All outbreaks with first illness onset during 2013–2014 reported by December 31, 2015 are included in this report. NORS defines a waterborne disease outbreak as the occurrence of a similar illness in two or more persons who are linked by time and location to a common water exposure. For each outbreak, data were collected regarding the number of ill persons, hospitalizations, and deaths, along with the sex, age group, symptoms, and duration of illness for persons affected by the outbreak. Results of epidemiologic and laboratory investigations are also reported, including the suspected or confirmed etiologic agent, the type of water to which patients were exposed, and the setting of the water exposure. During the analysis, predominant illness type was assigned, and water type was further categorized as a human-made or natural water system. Human-made water systems include infrastructure intended for water storage or recirculation, whereas natural water systems include raw water that might or might not be treated at the point of exposure. Waterborne disease outbreaks associated with environmental and undetermined exposures to water from prior years have been reported previously (https://www.cdc.gov/healthywater/surveillance/environmental/environ-water-surveillance-reports.html).

Environmental Exposure to Water

Fifteen outbreaks associated with environmental exposures to water were reported from 10 states during the reporting period (Table 1). A total of 226 cases were identified in association with these outbreaks, with 69 hospitalizations and nine deaths reported. An etiologic agent was confirmed in 14 of 15 outbreaks. *Giardia duodenalis* was determined to be the etiology of seven outbreaks, and *Legionella pneumophila* was implicated in six. No hospitalizations or deaths were reported in association with outbreaks of giardiasis, whereas legionellosis outbreaks accounted for 90% (62 of 69) of hospitalizations and all nine deaths. The remaining seven (10%) hospitalizations were associated with an outbreak involving skin infections caused by *Pseudomonas aeruginosa*. The majority of the reported outbreaks involved either acute respiratory illness (six of 15, caused by *Legionella*) or acute gastrointestinal illness (eight of 15 [seven *Giardia*, one unknown]). *Giardia* was the etiology of six of seven outbreaks linked to a natural water system, whereas *Legionella* caused six of eight outbreaks linked to a human-made water system (Table 2).

Undetermined Exposure to Water

Twelve outbreaks associated with an undetermined exposure to water were reported from eight states (Table 1), involving 63 cases, 39 hospitalizations and eight deaths. Outbreaks of acute respiratory illness caused by *Legionella* accounted for 11 (92%) of these outbreaks, along with all reported

TABLE 1. Waterborne disease outbreaks associated with environmental and undetermined exposures to water* (n = 28), by state or jurisdiction and month of first case onset — Waterborne Disease and Outbreak Surveillance System, United States, 2013–2014

Exposure state/ Jurisdiction/ Type of exposure	Month	Year	Etiology†	Predominant illness§	No. cases	No. hospitalizations¶	No. deaths**	Water type	Exposure setting
Environmental									
Colorado	Oct	2014	*G. duodenalis*	AGI	9	0	0	River/Stream	Park
Illinois	Jan	2013	*P. aeruginosa*	Skin	30	7	0	Other††	Store/Shop
Illinois	Sep	2013	*G. duodenalis*	AGI	69	0	0	River/Stream	Park
Michigan	Oct	2014	*G. duodenalis*	AGI	6	0	0	Sewage	Private residence
Minnesota	Dec	2013	*L. pneumophila* serogroup 1	ARI	2	2	0	Ornamental fountain	Casino
Minnesota	Jul	2014	*G. duodenalis*	AGI	6	0	0	River/Stream	Public outdoor area
New Mexico	Jul	2013	*G. duodenalis*	AGI	3	0	0	River/Stream	Camp/Cabin setting
New York	Oct	2013	*G. duodenalis*	AGI	5	0	0	Spring	Other§§
Ohio	Jun	2013	*L. pneumophila* serogroup 1	ARI	39	32	6	Cooling tower	Hospital/Health care
Ohio	Jul	2013	*L. pneumophila* serogroup 1	ARI	3	2	1	Cooling tower	Factory/Industrial facility
Ohio	Aug	2014	*L. pneumophila* serogroup 1	ARI	22	8	0	Evaporative condenser/Air conditioner	Church/Place of worship
Pennsylvania	Jul	2013	*L. pneumophila* serogroup 1	ARI	6	3	0	Cooling tower	Prison/Jail (Juvenile/Adult)
Pennsylvania	Aug	2013	*L. pneumophila* serogroup 1	ARI	15	15	2	Cooling tower/ Ornamental fountain	Hospital/Health care
Utah	Oct	2014	*G. duodenalis*	AGI	4	0	0	River/Stream	Backcountry
Virginia	May	2013	Unknown	AGI	7	0	0	Lake/Reservoir/ Impoundment	Public outdoor area
Undetermined									
Alabama	Sep	2013	*L. pneumophila* serogroup 1	ARI	19	14	5	Unknown	Long-term care facility
California	Jan	2014	*L. pneumophila* serogroup 1	ARI	2	2	0	Unknown	Hotel/Motel/ Lodge/Inn
California	Apr	2014	*L.pneumophila* serogroup 2–14	ARI	2	2	1	Unknown	Assisted living facility
Kentucky	Jun	2014	*L. pneumophila* serogroup 1	ARI	6	2	0	Unknown	Long-term care facility
Montana	Jul	2014	*Cryptosporidium* sp.	AGI	11	0	0	Unknown	NR
New York	May	2014	*L. pneumophila* serogroup 1	ARI	2	2	0	Unknown	NR
Ohio	Jul	2009¶¶	*L. pneumophila* serogroup 1	ARI	9	6	0	Unknown	Long-term care facility
Ohio	Jul	2013	*L. pneumophila* serogroup 1	ARI	2	2	0	Unknown	Indoor Workplace/ Office
Ohio	Mar	2014	*L. pneumophila* serogroup 1	ARI	4	2	1	Unknown	Long-term care facility
Ohio	Apr	2014	*L. pneumophila* serogroup 1	ARI	4	2	1	Unknown	Long-term care facility
Ohio	Oct	2014	*L. pneumophila* serogroup 1	ARI	2	2	0	Unknown	Hospital/Health care
Pennsylvania	Jan	2014	*L. pneumophila* serogroup 1	ARI	6	6	0	Unknown	Assisted living facility
Texas	Apr	2013	*L. pneumophila* serogroup 1	ARI	3	3	0	Unknown	Prison/Jail (Juvenile/Adult)

Abbreviations: AGI = acute gastrointestinal illness; ARI = acute respiratory illness; *G. duodenalis* = *Giardia duodenalis*; *L. pneumophila* = *Legionella pneumophila*; *P. aeruginosa* = *Pseudomonas aeruginosa*; Skin = illnesses, conditions, or symptoms related to the skin; NR = not reported.

* The environmental exposure to water category includes outbreaks not associated with exposure to drinking water systems (i.e., public, private or bottled water) or recreational water venues (e.g., swimming pools, lakes). The undetermined exposure to water category includes outbreaks where a single water exposure (i.e., treated or untreated recreational water, drinking water, or environmental exposure) could not be determined based on available evidence.

† Etiologies listed are confirmed, unless indicated "suspected"; for multiple-etiology outbreaks, etiologies are listed in alphabetical order.

§ The category of illness reported by ≥50% of ill respondents; all legionellosis outbreaks were categorized as acute respiratory illness.

¶ Value was set to "missing" in reports where zero hospitalizations were reported and the number of persons for whom information was available was also zero.

** Value was set to "missing" in reports where zero deaths were reported and the number of persons for whom information was available was also zero.

†† This outbreak was associated with a water storage container used in a tattoo and piercing shop.

§§ This outbreak was associated with a spring on a private property in a rural area.

¶¶ This outbreak from 2009 was not included in previous National Outbreak Reporting System reports. Data from this outbreak are presented in this table but not included in the analysis and discussion.

TABLE 2. Summary of waterborne disease outbreaks associated with environmental exposures to water and undetermined exposures to water, by *Legionella* and other etiologies — Waterborne Disease and Outbreak Surveillance System, United States, 2013–2014

Outbreak characteristic	Environmental exposures			Undetermined exposures		
	Legionella, No. (% of total)*	Other etiology†, No. (% of total)*	Total	*Legionella*, No. (% of total)*	Other etiology†, No. (% of total)*	Total
Outbreaks	6 (40)	9 (60)	**15**	11 (92)	1 (8)	**12**
Cases	87 (38)	139 (62)	**226**	52 (83)	11 (17)	**63**
Hospitalizations	62 (90)	7 (10)	**69**	39 (100)	0 (0)	**39**
Deaths	9 (100)	0 (0)	**9**	8 (100)	0 (0)	**8**
Institutional settings§	3 (100)	0 (0)	**3**	6 (100)	0 (0)	**6**
Water type						
Human-made system¶	6 (75)	2 (25)	**8**	10 (100)	0 (0)	**10**
Natural system**	0 (0)	7 (100)	**7**	0 (0)	0 (0)	**0**
Unknown††	0 (0)	0 (0)	**0**	1 (50)	1 (50)	**2**

* Percentages are calculated separately for outbreaks associated with environmental exposures to water and outbreaks associated with undetermined exposures to water. These percentages might not sum to 100 because of rounding.
† Other etiologies include *Giardia*, *Pseudomonas*, *Cryptosporidium*, and unknown.
§ Institutional settings include: hospital/healthcare, long-term care facility, prison/jail.
¶ Includes all outbreaks involving water associated with human-made structures (e.g. infrastructure for water storage or recirculation).
** Includes all outbreaks associated with nonrecreational exposure to water from the natural environment.
†† Human-made versus natural water system is unknown for two outbreaks where the setting was unreported and the water type was undetermined.

hospitalizations and deaths. One outbreak of acute gastrointestinal illness caused by *Cryptosporidium* was also reported. In addition, one outbreak caused by *Legionella* with first illness onset in 2009 was reported during this reporting period, resulting in nine reported cases and six hospitalizations. Data from this outbreak are presented (Table 1) but not included in the analysis and discussion of outbreaks for 2013–2014.

Discussion

This summary of waterborne disease outbreaks associated with environmental or undetermined exposure to water features a range of etiologic agents and illustrates that human illness can result from interaction with contaminated water in numerous settings.

Similar numbers of waterborne disease outbreaks were reported in association with environmental exposures to water linked with human-made (eight outbreaks) and with natural water systems (seven). Six of the outbreaks associated with environmental exposure to water from human-made water systems were caused by *Legionella*. Water management programs can effectively control the growth and spread of *Legionella* in these water systems and are an important tool in outbreak prevention (*6*,*7*). All but one of the outbreaks associated with natural water systems were caused by *Giardia* and involved ingestion of water from a river, stream, or spring. To prevent illnesses and outbreaks in backcountry settings, it is important to appropriately treat water obtained from the natural environment before consuming it. (https://www.cdc.gov/healthywater/drinking/travel/backcountry_water_treatment.html).

Consistent with what has been reported previously (*5*), (11 of 12) outbreaks associated with an undetermined exposure to water in this report were caused by *Legionella*. These outbreaks could not be definitively linked to a single water exposure because they were associated with multiple suspected or confirmed water types (e.g., both spa and drinking water systems were implicated) or because insufficient epidemiologic, laboratory, or environmental data were available to identify a single exposure. Investigations of legionellosis outbreaks exemplify the challenges of determining a single water exposure associated with illness, as *Legionella* can colonize environmental, recreational, and drinking water systems, creating multiple opportunities for susceptible persons to be exposed to contaminated aerosols. All of the legionellosis outbreaks in this report were associated with human-made water systems. Although water management programs are broadly effective for reducing *Legionella* in a majority of these systems, identification of a specific exposure can help identify system control deficiencies and inform timely and targeted remediation to prevent future illness. Furthermore, these challenges underscore the importance of strong partnerships among epidemiology, laboratory, and environmental health practitioners in support of these complex investigations. In this report, *Legionella* was responsible for all nine outbreaks linked to institutional settings and was responsible for all 17 reported deaths and 94% of all reported hospitalizations. This corresponds with surveillance data from drinking water–associated outbreaks (*8*) and underscores the importance of water management programs for maintaining water quality, preventing illness, and saving lives.

The findings in this report are subject to at least one limitation. State and local health departments have varying capacities to detect, investigate, or report these outbreaks. As a result, these data likely underestimate the actual incidence of outbreaks and do not provide an appropriate estimate of the total number of cases or outbreaks for a specific time or location.

Summary

What is already known about this topic?

Despite ongoing prevention measures, waterborne disease outbreaks caused by environmental exposure to water (linked to water not associated with a recreational water venue or drinking water system) continue to occur. For certain waterborne disease outbreaks, the specific water exposure cannot be determined based on available evidence, including certain *Legionella* outbreaks involving multiple water exposures. CDC collects data on all waterborne disease outbreaks from states and territories through the National Outbreak Reporting System.

What is added by this report?

Fifteen outbreaks associated with an environmental exposure to water and 12 outbreaks with an undetermined exposure to water from 2013 to 2014 were reported to CDC, resulting in at least 289 cases of illness, 108 hospitalizations, and 17 deaths. *Legionella* was responsible for 63% of outbreaks, 94% of hospitalizations, and all deaths. All outbreaks of legionellosis were associated with human-made water systems, including infrastructure intended for water storage or recirculation.

What are the implications for public health practice?

Waterborne disease outbreaks can be caused by exposure to water in numerous settings. Public health surveillance is important for understanding the incidence of outbreaks associated with environmental and undetermined exposures to water and for prevention of future outbreaks. Based on the outbreaks included in this summary, future prevention measures should focus on water management programs in human-made water systems to control *Legionella* and appropriate point-of-use treatment of raw water from natural water systems before consumption to inactivate *Giardia*.

Despite this limitation, more states reported outbreaks associated with environmental or undetermined exposures to water in this period than did in previous years (27 versus 18 reported for 2011 to 2012 [*1*]).

Outbreak surveillance data play a critical role in waterborne disease prevention for a broad range of pathogens across numerous water types. *Legionella* continues to challenge public health efforts to investigate and prevent outbreaks in human-made water systems and remains a key target for decreasing waterborne disease morbidity and mortality. *Giardia* remains a health risk for persons consuming water from natural water systems and should continue to be an area of focus for health education and prevention activities in these settings. Strong partnerships among epidemiology, laboratory, and environmental health practitioners at all levels are essential for effectively investigating and preventing waterborne disease outbreaks and protecting public health.

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Conflict of Interest

No conflicts of interest were reported.

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Country Immunization Information System Assessments — Kenya, 2015 and Ghana, 2016

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The collection, analysis, and use of data to measure and improve immunization program performance are priorities for the World Health Organization (WHO), global partners, and national immunization programs (NIPs). High quality data are essential for evidence-based decision-making to support successful NIPs. Consistent recording and reporting practices, optimal access to and use of health information systems, and rigorous interpretation and use of data for decision-making are characteristics of high-quality immunization information systems. In 2015 and 2016, immunization information system assessments (IISAs) were conducted in Kenya and Ghana using a new WHO and CDC assessment methodology designed to identify root causes of immunization data quality problems and facilitate development of plans for improvement. Data quality challenges common to both countries included low confidence in facility-level target population data (Kenya = 50%, Ghana = 53%) and poor data concordance between child registers and facility tally sheets (Kenya = 0%, Ghana = 3%). In Kenya, systemic challenges included limited supportive supervision and lack of resources to access electronic reporting systems; in Ghana, challenges included a poorly defined subdistrict administrative level. Data quality improvement plans (DQIPs) based on assessment findings are being implemented in both countries. IISAs can help countries identify and address root causes of poor immunization data to provide a stronger evidence base for future investments in immunization programs.

In 2001, WHO developed a methodology, the Data Quality Audit (*1*) to be used in lower- and middle-income countries to assess NIP administrative vaccination coverage data quality (*2*,*3*). WHO adapted this methodology for NIPs as a self-assessment tool, the Data Quality Self-Assessment (*4*). However, these methodologies focused on data validation and often missed underlying systemic issues, sometimes resulting in recommendations that were not actionable, not implemented, or that had little impact (*5*,*6*). In 2014, WHO and CDC collaborated to develop updated guidance for IISAs. Designed to be adaptable to a specific country context, the IISA guidance consists of four modules (Box). Modules are designed to identify the root causes of data quality problems and inform the development of actionable DQIPs.

BOX: Immunization information system assessment modules

Module 1: Desk Review
- Review of systems, processes, governance, and workforce to create an immunization data flow diagram.
- Support from a checklist and implemented through individual and focus group interviews.
- A systematic review of forms, tools, and the reports of previous assessments is performed to identify redundant tools and follow up any actions taken on previous recommendations.

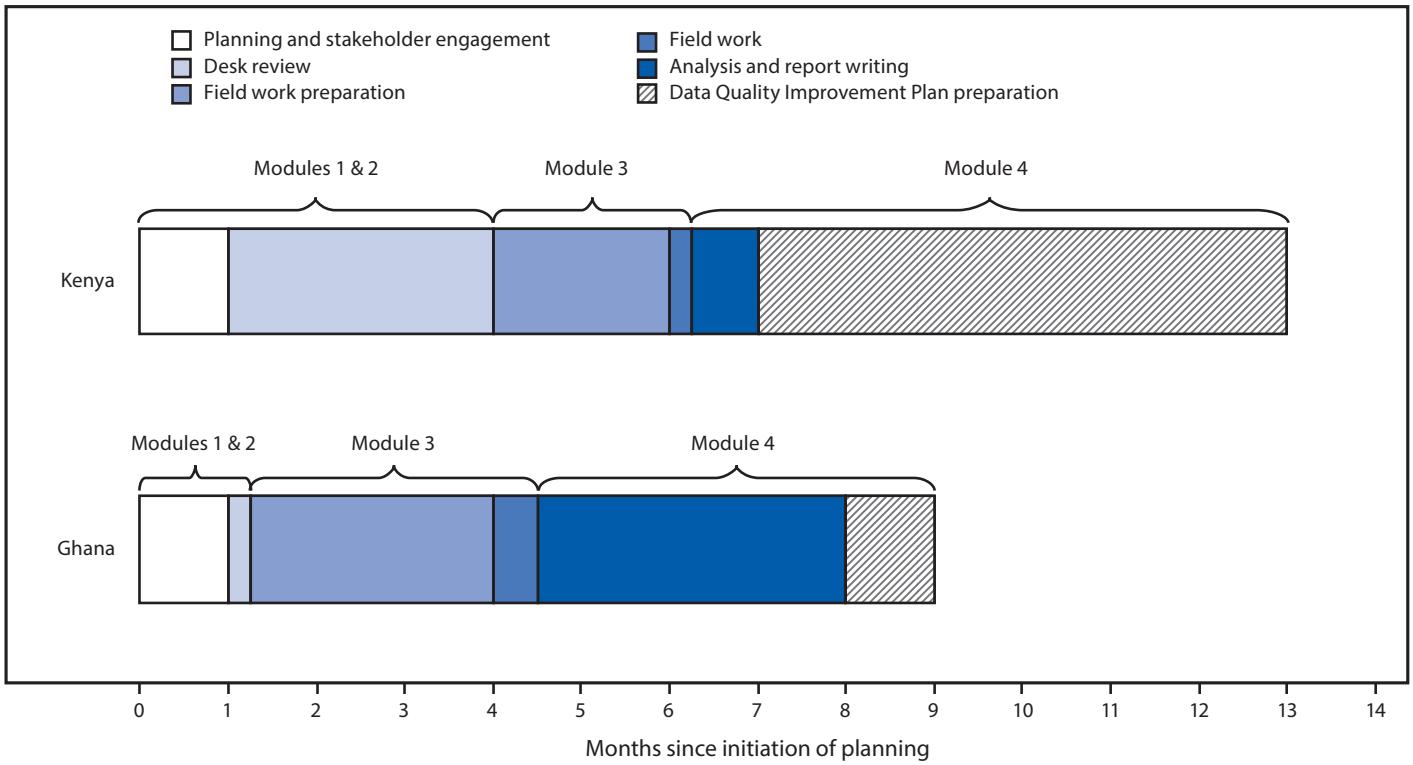
Module 2: National Data Review
- Evaluation of the completeness, internal consistency, trends, and external consistency of national administrative vaccination coverage data through triangulation with external sources following a defined protocol.

Module 3: Field Data Collection
- Field teams administer a qualitative questionnaire and triangulate multiple sources of immunization data in a purposive sample of geographic regions, subnational sites, and health facilities.
- Team members are assigned a thematic area on which to focus observations during site visits.
- Topics include the following:
  - Recording and data verification
  - Data reporting, analysis
  - Denominator
  - Workforce, training, and human resources

Module 4: Data Quality Improvement Plan (DQIP) Development
- Debrief and review of all data and information gathered in the prior three modules.
- Develop a plan through root cause discovery using an established framework with engagement of stakeholders.

The first IISA was conducted in Kenya in 2015. The desk review and national data review modules were performed remotely over a 3-month period using data and documents gathered by the Kenya Ministry of Health; the reviews were finalized 2 months before fieldwork began (Figure). Field questionnaires

FIGURE. Timeline of key steps* in immunization information system assessments† — Kenya, 2015 and Ghana, 2016



* Indicates time between initiation of key steps rather than time of continuous work on each step; work on each module had to fit within the national immunization program calendar.
† Module 1 = desk review; Module 2 = national data review; Module 3 = field data collection; Module 4 = Data Quality Improvement Plan development.

were refined using desk review findings and pilot testing. Teams collected data from four counties, eight subcounties, and 16 health facilities over a 5-day period. The DQIP was finalized 6.5 months after conclusion of the fieldwork.

An IISA was conducted in Ghana during 2016; modules were adapted to suit country needs. The desk review and national data review modules were conducted collaboratively by the Ghana Ministry of Health, WHO, and CDC during a 3-day in-country meeting 2.5 months before commencement of fieldwork. Participants were divided into two teams; one created a detailed description of the immunization data system, and the other analyzed immunization data trends and selected field assessment sites. After piloting the questionnaires, field teams visited four regions, eight districts, 14 subdistricts, and 34 health facilities over 7 days. Teams conducted initial analyses to create region-specific presentations for the debriefing. The DQIP was finalized 4.5 months after completion of the fieldwork.

In both countries, four field data collection teams were deployed for the IISA, each composed of three to four members, including national and subnational ministry of health and NIP officials and one partner (WHO or CDC) representative. Subnational staff members evaluated sites outside their jurisdiction. Purposive sampling was used to select diverse sites, accounting for setting, population density, and vaccination coverage. Field teams used standardized questionnaires to gather information on immunization data practices and challenges. To assess concordance among data sources, teams compared aggregate totals of administered third doses of diphtheria and tetanus toxoid and pertussis (DTP3) vaccine and oral poliovirus (OPV3) vaccine among different facility data collection tools (tally sheets, monthly reports, and child registers). These totals were compared with data at higher administrative levels. After data analysis was finalized, a DQIP was developed.

Assessment results indicated a range of performance across indicators in Kenya and Ghana (Table). Staff members in 10 of 16 health facilities in Kenya and 23 of 34 in Ghana reported meeting monthly to discuss vaccine administration data. However, only five health facilities in Kenya and 14 in Ghana displayed these data using an updated monitoring chart. Staff members in half of facilities (Kenya = 50%, Ghana = 53%) reported that monthly targets for immunization of children aged <1 year were not accurate; targets were felt to be too high or too low compared with the actual population size. Reasons

cited by staff members for concerns about target population sizes were similar across sites, including population migration and clients crossing between ill-defined health facility catchment areas. Staff members at most facilities (Kenya = 81%, Ghana = 100%) reported needing additional training in at least one of the following immunization-data–quality domains: record-keeping, reporting, analysis, and use for action.

In Kenya, concordance was higher between data reported at the subcounty and health facility levels (63%) than between different data sources within the health facility (0%–31%); in Ghana, concordance was poor between subdistrict and health facility data (25%). In both countries, concordance between immunization tally sheets and child registers at health facilities was low (Kenya = 0%, Ghana = 3%) (Table). Root causes of data quality challenges reported by staff members in Kenya include redundant data collection tools, lack of transportation, limited supportive supervision, and lack of airtime or internet access for electronic data reporting. In Ghana, the subdistrict level is responsible for providing supportive supervision to assigned health facilities. However, subdistrict staff members are co-located within designated health facilities; one set of staff members are responsible for all operations within their own facility as well as subdistrict supervisory activities. Root causes of data quality challenges noted by staff members in Ghana include poorly defined roles of subdistrict staff members and a lack of training on supportive supervision, data management, and interpretation. In contrast, district staff members in Ghana demonstrated proficiency in data analysis, use, and interpretation, based on field team observations of vaccination rate monitoring charts and responses to interview questions on calculation of key indicators.

TABLE. Vaccine administration data concordance* and selected data quality and data use indicators, by country— Kenya immunization information system assessment (IISA), 2015 and Ghana IISA, 2016

Selected data quality and data use indicators from IISA	No. subnational sites (%)	
	Kenya, n = 8	Ghana, n = 16
Subnational level		
Concordance between received facility monthly report and subnational database	5 (63)	4 (25)
Health facility data quality and use indicators	**No. facilities (%)**	
	Kenya, n = 16	**Ghana, n = 34**
Concordance between child vaccination register and facility vaccination tally sheets	0 (0)†	1 (3)
Concordance between facility monthly report and facility vaccination tally sheets	5 (31)	13 (38)
Staff members meet at least monthly to discuss immunization data	10 (63)	23 (68)
Up-to-date, properly filled immunization monitoring chart	5 (31)	14 (41)
Staff members felt they need more training in at least one domain of immunization data management	13 (81)	34 (100)
Staff members felt their monthly target population for immunization was not accurate§	8 (50)	18 (53)

* Defined as 100% concordance for both the third dose of oral poliovirus vaccine (OPV3) and the third dose of diphtheria and tetanus toxoids and pertussis vaccine (DTP3) over all months compared.
† Field team compared tally sheet and register data at 15 of 16 facilities visited in Kenya.
§ Targets were thought to be too high or too low compared with actual population size observed by staff members.

Discussion

In addition to identifying opportunities to improve NIP vaccination data quality in each country, the updated approach described here for assessing immunization data quality and developing a plan for improvement in Kenya and Ghana can inform future IISAs. Fieldwork was rapid in both countries; however, scheduling all the steps of an IISA in a condensed period can be challenging because of multiple NIP priorities and activities. One year from initiation of planning to consensus on a DQIP might be a realistic timeframe for many countries. Partner engagement and planning should begin at least 5 months before the projected start of fieldwork. The desk review might vary in duration depending upon the amount of information included, size of the team reviewing, and whether the review is done remotely or in-country. Additional time should be allotted for special circumstances such as political instability or the need for document translation.

The experiences in Kenya and Ghana illustrate that the desk review and national data review modules can be adapted by countries under flexible IISA guidelines. More expedient implementation of the two modules was accomplished in Ghana by working in-country with the Ghana Ministry of Health and partners. Regardless of where reviews are conducted, ministry of health and in-country partners are necessary for compiling the required data and documents. For fieldwork, three to four member teams were sufficient for data collection, yet manageable for facilities. Diverse field teams composed of national, subnational, and partner staff members incorporated multiple viewpoints into findings. Assigning subnational staff members to geographical subunits outside their jurisdiction reduced the potential for bias and provided staff members with a range of perspectives.

Various root causes of data quality challenges were identified. In both Kenya and Ghana, data in health facility registers were incomplete and demonstrated low concordance with other data sources. Other challenges included a low level of confidence in target population data, self-identified need for facility staff member training, and infrequent analysis and use of immunization data. Triangulation of data identified stronger subnational data concordance in Kenya, whereas Ghana had administrative and training support challenges at the subdistrict level.

Summary

What is already known about this topic?

The availability, quality, and use of immunization data are widely considered to form the foundation of successful national immunization programs. Lower- and middle-income countries have used systematic methods for the assessment of administrative immunization data quality since 2001, when the World Health Organization (WHO) developed the Data Quality Audit methodology. WHO adapted this methodology for use by national programs as a self-assessment tool, the Data Quality Self-Assessment. This methodology was further refined by WHO and CDC in 2014 as an immunization information system assessment (IISA).

What is added by this report?

Findings of immunization information system assessments in Kenya and Ghana identified some common challenges, such as incompleteness of the facility child register, low confidence in target population data, and infrequent analysis and use of data at the facility level. The assessments also examined larger systemic challenges that could explain the root causes of these problems, such as a poorly defined subdistrict administrative level in Ghana and need for training on data quality and data use among facility staff in both countries.

What are the implications for public health practice?

The experience gained from implementing assessments using updated IISA guidance in Kenya and Ghana provides an opportunity to inform other countries interested in best practices for assessing their data quality and creating actionable data quality improvement plans. Data quality improvement is important to provide the most accurate and actionable evidence base for future decision-making and investments in immunization programs. This review provides best practice experiences and recommendations for countries to use an IISA to assess data quality from national administrative structure down to the facility level. This methodology also meets the requirements for use by Gavi, the Vaccine Alliance, for monitoring national immunization data quality at a minimum interval of every 5 years in conjunction with funding decisions.

The findings in this report are subject to at least two limitations. First, findings are not nationally representative, which could have resulted in over- or underestimation of the concordance of vaccination event data between data collection tools and administrative levels. Second, this report describes the data from two countries; because each country is unique, these findings might not be generalizable to other contexts.

Importantly, IISA guidance emphasizes following up all findings with an evidence-based, feasible DQIP developed collaboratively to fit within existing ministry of health and NIP timelines. Concrete actions have been taken based on the findings of the IISAs described. In Kenya, national and county target-setting workshops were convened; as a result, the DQIP was integrated into Gavi, the Vaccine Alliance health systems, strengthening support to 17 selected counties. In Ghana, pilot changes are being made to improve the managerial and supervisory skills of subdistrict staff members. In addition, data quality content is being incorporated into preprofessional coursework for health professional studies as well as continuing education for current staff members. In this way, the updated IISA guidance and its focus on data for action is providing an impetus for long-term change. Ultimately, higher quality immunization data provide better evidence for subsequent investments and interventions related to immunization programs, vaccine preventable disease surveillance, and outbreak response.

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Conflict of Interest

No conflicts of interest were reported.

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Meeting Summary: State and Local Implementation Strategies for Increasing Access to Contraception During Zika Preparedness and Response — United States, September 2016

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Zika virus infection during pregnancy is a cause of microcephaly and other serious brain abnormalities (*1*). To support state and territory response to the threat of Zika, CDC's Interim Zika Response Plan outlined activities for vector control; clinical management of exposed pregnant women and infants; targeted communication about Zika virus transmission among women and men of reproductive age; and primary prevention of Zika-related adverse pregnancy and birth outcomes by prevention of unintended pregnancies through increased access to contraception.* The most highly effective,† reversible contraception includes intrauterine devices and implants, known as long-acting reversible contraception (LARC). On September 28, 2016, the Association of Maternal and Child Health Programs (AMCHP) and CDC facilitated a meeting in Atlanta, Georgia, of representatives from 15 states to identify state-led efforts to implement seven CDC-published strategies aimed at increasing access to contraception in the context of Zika virus (*2*). Qualitative data were collected from participating jurisdictions. The number of states reporting implementation of each strategy ranged from four to 11. Participants identified numerous challenges, particularly for strategies implemented less frequently. Examples of barriers were discussed and presented with corresponding approaches to address each barrier. Addressing these barriers could facilitate increased access to contraception, which might decrease the number of unintended pregnancies affected by Zika virus.

Twenty-six participants representing 15 states and 11 local health departments and clinics§ were selected to attend the Atlanta meeting, based on successful implementation of at least two of the seven strategies for increasing access to contraception (Table 1). AMCHP conducted a premeeting web-based assessment among attendees on the use of specific approaches for implementing the seven strategies. Responses to the assessment represented 12 states, including 12 state-level participants and six local-level participants and service providers.¶ During the in-person meeting, participants discussed the premeeting assessment responses and identified approaches to addressing barriers and maximizing facilitators for increasing access to contraception in three AMCHP-facilitated discussion sessions. Representatives from federal agencies and maternal and child health (MCH) organizations participated and provided technical and scientific expertise.** CDC analyzed qualitative data (*3*) to identify state implementation approaches (Table 2) that addressed barriers to and facilitators of success for the seven strategies.

Strategy 1. Facilitate partnerships among insurers, manufacturers, and state agencies. Respondents from eight of 12 states indicated that their state health agencies partnered to implement a direct payment program to absorb contraceptive device acquisition and stocking costs, develop pharmacy contracts to obtain devices, bill insurers directly for devices, or offer an option to return unused or unopened devices (Table 1). Personnel turnover and limited understanding of the internal organization and structure of other agencies were identified as barriers to developing contracts with payers and manufacturers (Table 2). Leaders with successful external partnerships leveraged current health department structures to institutionalize interagency partnerships and implement public-private partnerships to address these barriers.

* https://www.cdc.gov/zika/public-health-partners/cdc-zika-interim-response-plan.html.

† Highly effective contraceptive methods result in a low pregnancy rate (i.e., fewer than one in 100 women using these methods will become pregnant during the first year of typical use).

§ A total of 15 state-level participants represented Colorado, Delaware, Georgia, Florida, Iowa, Louisiana, South Carolina, Tennessee, Texas, and Washington. There was one representative for each state health department, with Colorado, Florida, Iowa, Louisiana, and Texas having two state-level representatives. A total of 11 local-level participants represented urban areas and/or clinics in Arizona, Colorado, Florida, Georgia, Nebraska, New Mexico, New York, Texas, Washington, and Wisconsin. There was one representative for each local jurisdiction, with Colorado having two local-level representatives.

¶ A total of 12 states were represented in responses, including Arizona, Colorado, Delaware, Florida, Iowa, Louisiana, Nebraska, New York, South Carolina, Texas, Washington, and Wisconsin. Each state had one response, except three responses were received from Florida, and two responses each were received from Colorado, Iowa, Texas, and Washington, for a total of 18 responses overall. All respondents were state-level personnel except those from Washington, which included personnel at the state and local levels. Georgia, New Mexico, and Tennessee did not provide responses to the premeeting assessment.

** Participating federal agencies include CDC, Centers for Medicaid and Children's Health Insurance Plan Services/Centers for Medicare and Medicaid Services, Bureau of Primary Health Care/Health Resources and Services Administration, Food and Drug Administration, and Office of Population Affairs. Participating MCH organizations included AMCHP, American College of Obstetricians and Gynecologists, Association of State and Territorial Health Officials, CityMatCH, March of Dimes, National Family Planning and Reproductive Health Association, and National Association of City and County Health Officials.

TABLE 1. State and local jurisdictional-level strategies and approaches for increasing access to contraceptive methods — Association of Maternal and Child Health Programs and CDC-sponsored premeeting assessment topics, Atlanta, Georgia, September 2016

Strategy	Potential approaches to implement strategy
1. Facilitate partnerships among private and public insurers, device manufacturers, and state agencies	Establish direct payment program to absorb acquisition and stocking costs Develop pharmacy contracts to obtain a limited number of LARC devices Develop pharmacy contracts to return unused and unopened LARC devices Develop pharmacy contracts to bill insurers directly for LARC devices
2. Reimburse providers for the full range of contraceptive services	Implement a payment policy to reimburse for the costs of screening for pregnancy intention Implement a payment policy to reimburse for the costs of client-centered counseling Implement activities to reduce barriers to supplies by using prestocked kits for immediate postpartum LARC insertion Implement a payment policy to reimburse for the actual cost of LARC devices to provide the full range of contraceptive methods Develop a payment policy for device insertion, device removal, device replacement, device reinsertion, and client follow-up Implement a payment policy for the costs of immediate postpartum LARC supplies, procedure, and follow-up
3. Remove logistic and administrative barriers for contraceptive services and supplies	Ensure all FDA-approved contraceptive methods are covered by state policy Eliminate requirement for prior authorization for LARC prescriptions in state payment plan Eliminate requirement for multiple visits with a health care provider before LARC prescription in state payment plan Eliminate step therapy requirements before LARC prescription in state payment plan
4. Train health care providers on current insertion and removal techniques for LARC using evidence-based guidance	Incorporate federal evidence-based contraceptive guidance into state family planning guidelines Collect data on adopted or continued use of most or moderately effective FDA-approved methods of contraception among women aged 15–44 years* Collect data on adopted or continued use of LARC among women aged 15–44 years Provide resources to train and inform health care providers on LARC insertion and removal techniques Provide resources to providers to dispel common misperceptions about LARC methods including: IUD and infertility; IUD and abortifacients; LARC and cancer; LARC and weight gain; LARC and adolescents; LARC and nulliparous women
5. Support youth-friendly reproductive health services	Train health care providers to provide youth with client-centered reproductive health services Provide teen-focused, culturally appropriate materials for clinic services Collaborate with clinics to encourage expanded availability of adolescent-friendly reproductive health services (e.g., weekend and/or extended hours, eliminating prerequisite screening) Promote protocols to protect against confidentiality breaches, specifically for adolescent patients (e.g., not disclosing Explanation of Benefits to parents of minors)
6. Engage smaller or rural facilities including community health centers	Provide funding to smaller or rural health care facilities and clinics to support increased access to contraceptive services Develop policies on contraceptive use for smaller or rural health care facilities Provide targeted resources on highly effective, reversible contraception for providers serving predominantly small or rural communities
7. Assess client satisfaction with service provision and increase consumer awareness	Provide resources to clinics to collect or analyze data that assesses women's satisfaction with chosen contraceptive method(s) Engage in health promotion campaigns to increase consumer awareness about LARC methods

Abbreviations: Food and Drug Administration = FDA; intrauterine devices = IUD; long-acting reversible contraception = LARC.
* Moderately effective contraceptive methods include injectables, pills, patch, ring, and diaphragm. Approximately 6–12 pregnancies per 100 women using these methods will occur during the first year of typical use compared with the most effective birth control methods, which result in fewer than one pregnancy per 100 women during the first year of typical use.

Strategy 2. Reimburse providers for the full range of contraceptive services. Seven of 12 states implemented policies to reimburse providers for the actual cost of LARC devices and eliminate barriers in state payment plans for LARC prescriptions (Table 1). States described implementing a payment policy for immediate postpartum LARC supplies, procedures, and follow-up, using prestocked kits. States discussed payment policies to reimburse providers for pregnancy intention screening and client-centered contraceptive counseling. Successful approaches to overcoming payment barriers included leveraging health department support in developing immediate postpartum LARC policies that reimburse for the device costs, insertion fees, and training of mid-level providers on contraceptive counseling (Table 2).

Strategy 3. Remove logistic and administrative barriers for contraceptive services and supplies. Nine of 12 states

TABLE 2. Barriers, facilitators, and approaches for implementing strategies to increase access to contraception — Association of Maternal and Child Health Programs and CDC-sponsored meeting, Atlanta, Georgia, September 2016

Strategy	Barriers	Facilitators	Potential approaches to addressing barriers and maximizing facilitators
1. Facilitate partnerships among private and public insurers, device manufacturers, and state agencies	Consistent personnel turnover across agencies; limited understanding of internal structure of other agencies and organizations	Centralized state health department structure that partners to disseminate devices and revised policies	Institutionalize partnerships among agencies and organizations regardless of structure and personnel changes; establish public-private partnerships with device manufacturers, payers, health centers
2. Reimburse providers for full range of contraceptive services	Bundled reimbursement rates and global fees for immediate postpartum LARC; policies prohibiting prescription for LARC and insertion during the same visit	Expanded definitions of provider groups for provision of comprehensive client-centered counseling	Enhance reimbursement for immediate postpartum LARC services (device insertion and device cost); train mid-level providers, paraprofessionals, and support personnel on contraceptive counseling
3. Remove logistic and administrative barriers for contraceptive services and supplies	Lack of knowledge on billing and coding for contraceptive services; preapprovals, multiple visits, and step therapy requirements for clients to receive LARC; additional barriers for populations including the undocumented, uninsured, or incarcerated women of reproductive age	Provider champions influence provision of contraceptive services at the state, health systems, facility, and clinic levels	Train billers and coders on procedures for reimbursement policies; develop payment mechanisms for populations with less access to services; develop policies for same-day LARC insertion; eliminate prior authorization, cost sharing, and other requirements to receive LARC potentially leveraging 340B pricing; engage provider champions
4. Train health care providers on current insertion and removal techniques for long-acting reversible contraceptives	Lack of providers to insert LARC including family physicians, pediatricians, nurses; lack of information on providers who insert LARC	Release of updated evidence-based clinical guidance; release of updated quality family planning services recommendations	Complete a needs assessment of family planning services throughout the state; train providers on newest insertion techniques
5. Support youth-friendly reproductive health services	Policies on Explanation of Benefits release to policy-holder; clinic hours during normal business hours; clinics located far from schools	Available teen-focused, culturally appropriate materials	Engage in youth-friendly feedback on services including youth advisory boards, mystery shoppers, social media; ensure confidentiality of adolescent contraceptive services by revising policies with payers and insurers; encourage client-centered contraceptive counseling and screening for pregnancy intention for adolescents
6. Engage smaller or rural facilities including community health centers	Remote clinic location impacts availability of contraceptives and providers	Increased availability of telemedicine/ telehealth opportunities	Train personnel on billing and coding procedures for contraceptive methods; provide carve-out or subsidy funding for patient encounter, counseling, contraceptive device, and insertion
7. Assess client satisfaction with service provision and increase consumer awareness	Lack of data on client satisfaction with contraceptive method; limited funding for state-level social media or traditional media campaigns	Examples of successful social media or traditional media campaigns for replication among other states	Distinguish between client satisfaction and experience; develop surveillance data on satisfaction and experience; collaborate with nontraditional partners including supermarket chains, retail outlets, and airports, to provide messaging on contraception particularly during emergency response

Abbreviation: long-acting reversible contraception = LARC.

implemented approaches to eliminate requirements for prior authorization, multiple visits, and step therapy[††] approaches (Table 1). State-reported successful implementation approaches included training of billers and coders on reimbursement procedures, leveraging existing billing mechanisms (e.g., 340B pricing[§§]), eliminating requirements for multiple visits to

[††] Step therapy is a type of prior authorization requiring that prescriptions be filled with the most cost-effective drug therapy (i.e., generic) progressing to more costly or risky drug therapies as necessary. The generic drug options for long-acting reversible contraception (LARC) are limited.

[§§] 340B pricing is a discount drug program that requires drug manufacturers to provide outpatient drugs to eligible health care organizations/covered entities at significantly reduced prices. https://www.hrsa.gov/opa/index.html.

facilitate same-day insertion, removing barriers for vulnerable or targeted populations, and engaging provider champions[¶¶] to influence provision of services (Table 2).

Strategy 4. Train health care providers on current insertion and removal techniques for LARC, using evidence-based guidance. Ten of 12 states described integrating evidence-based contraceptive guidance into state family planning guidelines, collecting data on the use of the most effective or moderately effective[***] Food and Drug Administration (FDA)-approved contraceptive methods, and providing resources to dispel common provider misperceptions about LARC (Table 1). Successful approaches to initiating statewide training efforts included statewide service assessment and continuing training of providers on the newest evidence-based techniques (Table 2).

Strategy 5. Support youth-friendly reproductive health services. Most (11 of 12) states provided teen-focused, culturally appropriate materials, offered training to providers on the provision of youth-friendly services, encouraged expanded availability of youth-friendly reproductive health services, and ensured that confidentiality concerns of adolescents were addressed in state or clinic policies (Table 1). Meeting participants indicated that a successful implementation approach for this strategy included soliciting youth feedback on services through youth advisory boards, social media, and youth mystery shoppers[†††] at service sites (Table 2). Additional approaches include ensuring adolescent confidentiality among payers and insurers and appropriate screening and counseling for this age group.

Strategy 6. Engage smaller or rural facilities, including community health centers. Nine of 12 states provided funding to smaller or rural health care facilities and clinics, and targeted resources for LARC at these facilities (Table 1). Approaches to addressing barriers included training staff on billing and coding procedures, and funding subsidies in small or rural clinics for the client encounter, counseling, device cost, and insertion fees (Table 2).

Strategy 7. Assess client satisfaction with service provision and increase consumer awareness. Four of 12 states provided resources to assess client satisfaction with the chosen contraceptive method or engaged in health promotion campaigns to increase consumer awareness about highly effective, reversible methods (Table 1). Implementation approaches included developing assessment measures that differentiated between client satisfaction and client experience, and collaborating with nontraditional partners (including supermarket chains, retail outlets, or airports) to expand the reach of contraceptive messaging (Table 2). Meeting participants highlighted limited funding for state-level social media or traditional media campaigns as the greatest barrier to implementation. Use of consumer awareness media campaigns with nontraditional partners was discussed for the dissemination of prevention messaging during a public health emergency, particularly in the context of Zika preparedness. For example, partnering of the state health department with international airports to include Zika virus travel-related guidance from CDC was noted as an effective strategy for Zika preparedness messaging that could also include information on contraception access.

Discussion

Among the 12 state-level responses to the assessment, the majority indicated that their health departments are implementing strategy-specific approaches for facilitating partnerships among insurers and device manufacturers (eight states); removing logistic and administrative barriers for contraceptive services and supplies (nine); training health care providers (10); supporting youth-friendly services (11); and engaging smaller or rural facilities (nine). Fewer reported that their states are implementing strategy-specific approaches for reimbursing providers for the full range of contraceptive services (seven) or assessing client satisfaction and increasing consumer awareness (four).

In the context of Zika preparedness, reducing gaps in contraception access might help reduce the number of unintended pregnancies affected by Zika virus infection. States emphasized the importance of partnerships among state and federal health agencies, payers, device manufacturers, and clinics during an emergency response. Attendees also emphasized the importance of overcoming payment barriers to reimburse providers for the full range of services. Currently, many states bundle payment for contraception under one global fee, particularly for immediate postpartum LARC, limiting reimbursement for the full cost of a device and specific insertion procedures (*4*). State policies that allow reimbursement for comprehensive client-centered counseling services are always important, but particularly during an emergency response (*5*), as such policies are implemented in part to prevent coercion of clients to choose any method, including LARC, by supporting informed, autonomous client decisions based on women's individual needs and preferences (*6*).[§§§] During an emergency response,

[¶¶] Provider champions are persons who dedicate themselves to overcoming resistance or indifference to a beneficial intervention by supporting, publicizing, and implementing strategies to bridge the gap between knowledge and clinical practice.

[***] Moderately effective contraceptive methods include injectables, pills, patch, ring, and diaphragm. Approximately six to 12 per 100 women using these methods will become pregnant during the first year of typical use.

[†††] Youth mystery shoppers for contraceptive services are adolescents hired by an organization or agency (health department) to visit clinics posing as new patients to collect information on clinic flow, resources provided, and the quality of interaction with clinic personnel and providers.

[§§§] https://www.fpntc.org/training-and-resources/zika-toolkit-for-healthcare-providers-version-3-providing-family-planning.

it is also especially important to have straightforward and replicable campaigns to increase access to contraception to prevent unintended pregnancy. These are needed to support consumer-focused understanding by presenting the full range of reversible contraceptive methods, while describing the low maintenance and acknowledging the potential for side effects with LARC,¶¶¶ to increase awareness of contraceptive method options among all women of reproductive age, including adolescents. CDC works to develop evidence-based, clinical guidance during emergencies. During facilitated discussion, states requested detailed CDC response plans for increasing access to contraception to prevent unintended pregnancy, a primary strategy to reduce Zika-related adverse pregnancy and birth outcomes.

Participants emphasized that provider champions can increase both provision of LARC and training of clinical fellows and residents in current insertion and removal techniques. As service providers in the health care system, provider champions are well positioned to educate Medicaid agencies about the benefits of immediate postpartum LARC (*7*), take the lead in disseminating these practices to smaller and rural facilities, and serve as potential trainers and mentors to other providers. Participants discussed developing statewide provider networks to disseminate information and identify service providers who require additional training, and targeting training initiatives using evidence-based contraceptive guidance (*8*–*10*). Similar assessments have identified "contraceptive deserts," defined as U.S. counties with fewer than one clinic for every 1,000 women in need of publicly funded contraception, further highlighting the need for contraceptive service availability.****

The findings in this report are subject to at least three limitations. First, information on contraceptive access was obtained from a relatively small number of persons from invited states; analysis and subsequent approaches developed from information gathered might not be generalizable to all jurisdictions. Second, data collected from participants were self-reported, and therefore, do not necessarily represent official state policies or all activities occurring in a state. Finally, approaches to increasing contraception access developed by participating states have not been evaluated by other states to ensure applicability in all settings. Some approaches implemented by participating states might not be appropriate or successful in other jurisdictions.

For women who choose to delay or avoid pregnancy during the Zika virus outbreak, access to the full range of reversible contraceptive methods in all health care systems increases their options to prevent unintended pregnancies. States are encouraged to include strategies to increase access to contraceptive services as a primary strategy in Zika preparedness plans, to prevent adverse pregnancy and birth outcomes associated with Zika virus infection in pregnancy.

Summary

What is already known about this topic?

Zika virus infection during pregnancy is a cause of congenital microcephaly and other brain abnormalities. Preventing unintended pregnancy during the Zika virus outbreak is one primary strategy to reduce the number of pregnancies affected by Zika virus. Sexually active women of reproductive age and their sex partners who choose to delay or avoid pregnancy during the Zika virus outbreak should have access to all FDA-approved contraceptive methods, including highly effective, long-acting reversible contraception; however, barriers limit access and availability. CDC has outlined seven strategies states can implement to increase access to contraceptive services.

What is added by this report?

On September 28, 2016, a meeting of 26 representatives from 15 jurisdictions was convened in Atlanta, Georgia to identify state-led efforts to implement the seven strategies. The majority of participants' states implemented strategies facilitating external partnerships, removing logistic and administrative barriers, training providers, supporting youth-friendly services, and engaging smaller or rural facilities. A smaller proportion implemented strategies for increasing provider reimbursement, assessing client satisfaction, and increasing consumer awareness.

What are the implications for public health practice?

State-led approaches for implementing the seven strategies provide examples that can inform and support adoption in other jurisdictions in the context of Zika preparedness. These approaches could further facilitate access to contraception, which might decrease the number of unintended pregnancies affected by Zika virus infection.

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Conflict of Interest

No conflicts of interest were reported.

¶¶¶ https://thenationalcampaign.org/sites/default/files/resource-primary-download/whoops_proof_insights.pdf.

**** https://thenationalcampaign.org/deserts.

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Announcements

World Pneumonia Day — November 12, 2017

World Pneumonia Day, observed on November 12 each year, aims to highlight the huge toll pneumonia takes on children and adults worldwide. In 2015, an estimated 2.7 million persons died from respiratory infections, including 700,000–920,000 children aged <5 years (*1*,*2*). *Streptococcus pneumoniae* and *Haemophilus influenzae* type b bacteria cause most of these deaths; however, viruses, including influenza and respiratory syncytial virus, also have a considerable impact (*1*).

Multiple vaccines are available to help prevent pneumonia, including *Haemophilus influenzae* type b, influenza, measles, pertussis, pneumococcal, and varicella vaccines. Expanding the use of the pneumococcal conjugate vaccine in childhood immunization programs around the world has reduced disease incidence in recent years, particularly among children aged <5 years (*3*). Despite progress globally in reducing the incidence of pneumonia, recent U.S. outbreaks serve as a reminder of the importance of maintaining high vaccination coverage to prevent pneumonia. For example, as of August 25, 2017, more than a quarter (28%) of 79 measles patients in a Minnesota community with low measles-mumps-rubella vaccination coverage required hospitalization, primarily for treatment of dehydration or pneumonia (*4*).

In addition to vaccination, other strategies have been proven to help prevent pneumonia. Adherence to antibiotic use guidelines reduces the development of antibiotic resistance among pneumonia-causing organisms. In addition, access to tobacco cessation programs (*5*), decreased exposure to secondhand smoke (*5*) and reduction in indoor air pollution from biomass smoke in developing countries (*6*) are important pneumonia prevention strategies that can save lives. Continued efforts to improve access to appropriate treatment for those who get pneumonia are also needed. Information about World Pneumonia Day, including the 2017 Pneumonia and Diarrhea Progress Report, is available at http://stoppneumonia.org/.

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National Chronic Obstructive Pulmonary Disease Awareness Month — November 2017

Chronic obstructive pulmonary disease (COPD), which includes emphysema and chronic bronchitis, makes breathing difficult for the 16 million U.S. residents who have received a diagnosis of COPD and millions more who are not aware that they have it (*1*). COPD is the third leading cause of death in the United States (*1*). In collaboration with federal and nonfederal partners, the National Heart, Lung, and Blood Institute (NHLBI) released the COPD National Action Plan in May 2017 (*1*). This document provides a framework for reducing COPD's impact with roles for advocates and nonprofit organizations, health professionals, researchers, and patients and caregivers.

November is National COPD Awareness Month, an observance supported by NHLBI's COPD: Learn More, Breathe Better campaign. More information about COPD is available from CDC at https://www.cdc.gov/copd and from NHLBI at https://www.nhlbi.nih.gov/health/educational/copd.

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Announcement

U.S. Antibiotic Awareness Week — November 13–19, 2017

U.S. Antibiotic Awareness Week is an annual observance to raise awareness about antibiotic resistance and the importance of appropriate antibiotic prescribing and use. This year's observance coincides with the release of CDC's updated educational initiative "Be Antibiotics Aware: Smart Use, Best Care," and aims to engage health care professionals, advocacy groups, for-profit companies, state and local health departments, professional societies, the general public, the media, and others in efforts to improve antibiotic prescribing and use across all health care settings. This observance coincides with the World Health Organization's World Antibiotic Awareness Week and European Antibiotic Awareness Day on November 18.

Antibiotics save lives. When a patient needs antibiotics, the benefits outweigh the risks for side effects or antibiotic resistance. However, antibiotic resistance is one of the most urgent threats to the public's health. Each year in the United States, approximately 2 million persons are infected with antibiotic-resistant bacteria, and approximately 23,000 die as a result.* Helping health care professionals improve the way they prescribe antibiotics and improving the way patients take antibiotics helps keep everyone healthy now, helps fight antibiotic resistance, and ensures that lifesaving antibiotics will be available for future generations.

Preventing antibiotic-resistant infections and protecting the nation's health by improving antibiotic prescribing and use is a CDC priority. Additional information about "Be Antibiotics Aware" during U.S. Antibiotic Awareness Week is available at https://www.cdc.gov/antibiotic-use.

* https://www.cdc.gov/drugresistance/index.html.

Errata

Vol. 66, No. 29

In "*QuickStats*: Age-Adjusted Percentage of Adults Aged ≥18 Years Who Were Never in Pain, in Pain Some Days, or in Pain Most Days or Every Day in the Past 6 Months, by Employment Status — National Health Interview Survey, United States, 2016," on page 796, the caption should have read as follows:

"In 2016, **38.1%** of adults aged ≥18 years never had pain, **42.6%** had pain on some days, and **19.4%** had pain most days or every day in the past 6 months. A higher percentage of adults who were previously employed (**29.8%**) had pain most days or every day compared with never employed adults (**18.6%**) and currently employed adults (15.1%). Never employed adults (**41.9%**) and currently employed adults (**40.4%**) were more likely to report never having had pain than previously employed adults (**31.2%**)."

Vol. 66, No. 33

In "*QuickStats*: Percentage of Adults Who Ever Used an E-cigarette and Percentage Who Currently Use E-cigarettes, by Age Group — National Health Interview Survey, United States, 2016," on page 892, the caption should have read as follows:

"Overall, **15.3%** of adults aged ≥18 years had ever used an e-cigarette, and 3.2% currently used e-cigarettes in 2016. Adults aged 18–24 years were the most likely to have ever used an e-cigarette (**23.8%**); the percentage declined steadily to **4.4%** among adults aged ≥65 years. Adults aged 18–24 years (**4.7%**) and 25–44 years (4.2%) were more likely to be current e-cigarette users than adults aged 45–64 years (**2.8%**) and those aged ≥65 years (1.0%). Across all age groups, fewer than one fourth of adults who had ever used an e-cigarette reported being a current user."

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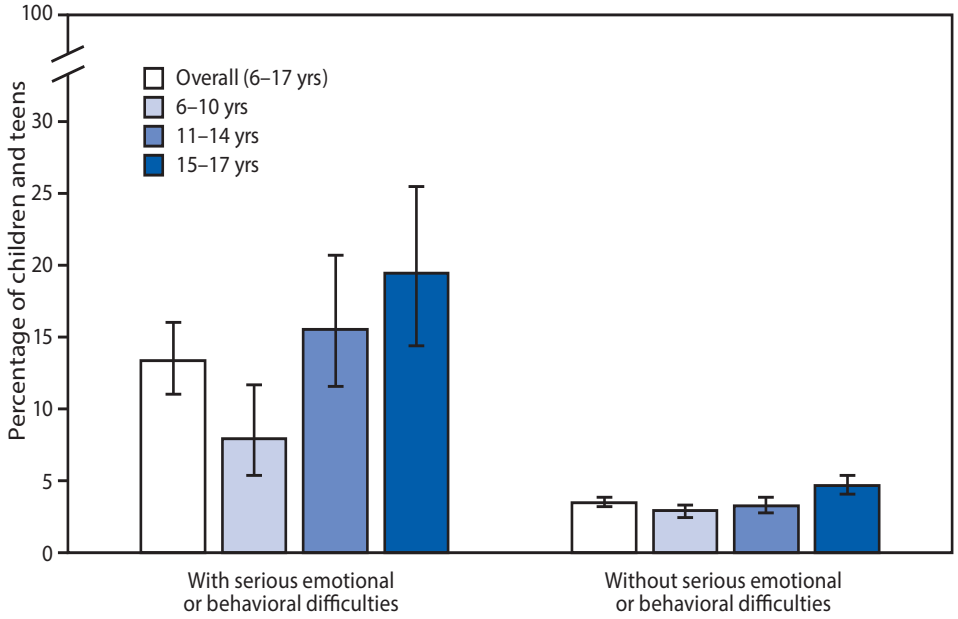
In "*QuickStats*: Percentage of Children Aged 6–17 Years Who Wear Glasses or Contact Lenses, by Sex and Age Group — National Health Interview Survey, 2016," on page 917, the caption should have read as follows:

"In 2016, the percentage of children aged 6–17 years who wear eyeglasses or contact lenses was higher among girls (**35.9%**) compared with boys (29.1%). Girls aged 6–9 years (**20.8%**) and 14-17 years (**51.4%**) were more likely than boys of the same age group (**15.4%** and **38.1%**, respectively) to wear eyeglasses or contact lenses. There was no statistically significant difference by sex for children aged 10-13 years (**35.4%** among girls, **33.7%** among boys). Among both girls and boys, children aged 14–17 years were most likely to wear eyeglasses or contact lenses and children aged 6–9 years were least likely to wear eyeglasses or contact lenses."

QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Percentage* of Children and Teens Aged 6–17 Years Who Missed >10 Days of School in the Past 12 Months Because of Illness or Injury,† by Serious Emotional or Behavioral Difficulties Status§ and Age Group — National Health Interview Survey, 2014–2016¶



* With 95% confidence intervals indicated by error bars.
† Number of missed school days was based on the following question: "During the past 12 months about how many days did (child) miss school because of illness or injury?" Children who did not attend school were excluded.
§ Serious emotional or behavioral difficulties (EBDs) were based on parents' responses to the following question: "Overall, do you think that (child) has any difficulties in one or more of the following areas: emotions, concentration, behavior, or being able to get along with other people?" Children whose parent or guardian responded "yes, definite" or "yes, severe" were defined as having serious emotional or behavioral difficulties. These difficulties might be similar to but do not equate with the federal definition of serious emotional disturbance. For 2014–2016 the prevalence of serious EBDs among children aged 6–17 years was 5.8%.
¶ Estimates are based on household interviews of a sample of the noninstitutionalized U.S. civilian population and are derived from the National Health Interview Survey Sample Child component.

During 2014–2016, children aged 6–17 years whose parent or guardian indicated the child had serious emotional or behavioral difficulties (EBDs) were almost four times as likely to miss >10 days of school because of illness or injury compared with children without serious EBDs (13.4% compared with 3.5%). Among children with serious EBDs, those aged 6–10 years were less likely (8.0%) to miss >10 days of school compared with children aged 11–14 years (15.6%) and children aged 15–17 years (19.5%). Among children without serious EBDs those aged 15–17 years (4.7%) were more likely to miss >10 school days compared with children aged 6–10 years (3.0%) and children aged 11–14 years (3.3%).

Source: National Center for Health Statistics. National Health Interview Survey, 2014–2016. https://www.cdc.gov/nchs/nhis.htm.

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