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World TB Day — March 24, 2015

Each year, World TB Day is observed on March 24. This annual event commemorates the date in 1882 when Robert Koch announced his discovery of *Mycobacterium tuberculosis*, the bacterium that causes tuberculosis (TB). World TB Day provides an opportunity to raise awareness about TB-related problems and solutions and to support worldwide TB control efforts.

For the second year, CDC supports the theme "Find TB. Treat TB. Working together to eliminate TB." Health officials in local and state TB programs are encouraged to provide educational awareness regarding TB to their communities and to work with other agencies and organizations that care for those most at risk for TB.

In 2014, a total of 9,412 new cases of TB were reported in the United States, a rate of 3.0 per 100,000 population (*1*). Although the total number of TB cases continues to decline, 2014 showed the smallest decline in incidence in over a decade. Nationally, TB still persists at greater incidence in foreign-born persons and racial or ethnic minorities.

CDC is committed to a world free from TB. Initiatives to improve awareness, testing, and treatment of latent TB infection and TB disease among groups at high risk are critical to achieve elimination of TB in the United States.

Additional information regarding World TB Day and CDC's TB elimination activities is available at http://www.cdc.gov/tb/events/worldtbday.

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1. Scott C, Kirking HL, Jeffries C, Price SF, Pratt R. Tuberculosis trends—United States, 2014. MMWR Morb Mortal Wkly Rep 2015;64:265–9.

Tuberculosis Trends — United States, 2014

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In 2014, a total of 9,412 new tuberculosis (TB) cases were reported in the United States, with an incidence rate of 3.0* cases per 100,000 persons, a decrease of 2.2% from 2013 (*1*). Although overall numbers of TB cases and rates continue to decline, the percentage decrease in rate is the smallest decrease in over a decade (*1*). This report summarizes provisional TB surveillance data reported to CDC's National Tuberculosis Surveillance System for 2014. TB cases and rates decreased among U.S.-born persons, and although the case rate also decreased among foreign-born persons,† there was an increase

* In 2013, the overall U.S. TB rate was 3.02 per 100,000 persons; this declined to 2.95 per 100,000 persons in 2014.

† Includes persons born outside the United States in American Samoa, the Federated States of Micronesia, Guam, the Republic of the Marshall Islands, Midway Island, the Commonwealth of the Northern Mariana Islands, Puerto Rico, the Republic of Palau, the U.S. Virgin Islands, and U.S. minor and outlying Pacific islands.

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in total number of cases among foreign-born persons. The rate among foreign-born persons in the United States in 2014 was 13.4 times higher than among U.S.-born persons. Racial/ethnic minorities continue to be disproportionately affected by TB within the United States. Asians continue to be the racial/ethnic group with the largest number of TB cases. Compared with non-Hispanic whites, the TB rate among Asians was 28.5 times higher, whereas rates among non-Hispanic blacks and Hispanics were each eight times higher. Four states (California, Texas, New York, and Florida), representing approximately one third of the U.S. population, accounted for half of all TB cases reported in 2014. Continued progress toward TB elimination in the United States will require focused TB control efforts among populations and in geographic areas with disproportionate burdens of TB.

Health departments in the 50 states and the District of Columbia (DC) electronically report to CDC verified TB cases that meet the CDC and Council of State and Territorial Epidemiologists case definition for TB.[§] Reports include the patient's self-reported race, ethnicity (i.e., Hispanic or non-Hispanic), human immunodeficiency virus (HIV) status, information about diagnosis and treatment, and drug-susceptibility test results for *Mycobacterium tuberculosis* isolates. CDC calculates national and state TB rates overall and by racial/ethnic group using currently available U.S. Census Bureau population estimates (*2*). The Current Population Survey provides the population denominators used to calculate TB incidence rates and percentage changes according to national origin.[¶] In 2014, 1.2% (117 of 9,412) of patients had unknown country of birth, and 0.5% (47 of 9,412) had unknown race/ethnicity. For this report, persons of Hispanic ethnicity might be of any race; non-Hispanic persons were categorized as black, Asian, white, American Indian/Alaska Native, Native Hawaiian or other Pacific Islander, or of multiple races.

The national TB incidence rate in 2014 was 3.0 cases per 100,000 persons, ranging by state from 0.3 in Vermont to 9.6 in Hawaii (median = 2.0) (Figure 1). Twenty-nine states and DC had lower rates in 2014 than in 2013; 21 states had higher rates. Ten states and DC had higher rates than the national average (Figure 1). In 2014, as in 2013, four states (California, Florida, New York, and Texas) reported >500 cases each. Combined, these four states accounted for 4,795 TB cases, or 50.9% of all U.S. cases in 2014.

Among U.S.-born persons, the number and rate of TB cases declined in 2014. The 3,114 TB cases in U.S.-born persons (representing 33.5% of all cases in persons with known national origin) indicated a 6.3% decrease in the number of cases compared with 2013 and a 64% decrease compared with 2000 (Figure 2). The TB rate of 1.1 per 100,000 U.S.-born persons represented a 6.8% decrease since 2013, and a 67.6% decrease since 2000.

[§] Available at http://wwwn.cdc.gov/nndss/script/casedef.aspx?condyrid=876&datepub=1/1/2009%2012:00:00%20am.

[¶] Additional information available at http://dataferrett.census.gov.

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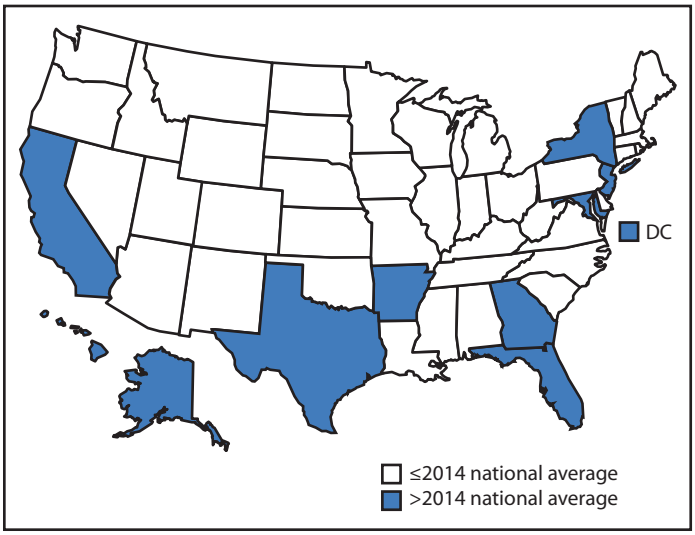
FIGURE 1. Incidence* of tuberculosis cases, by state and national average — United States, 2014†

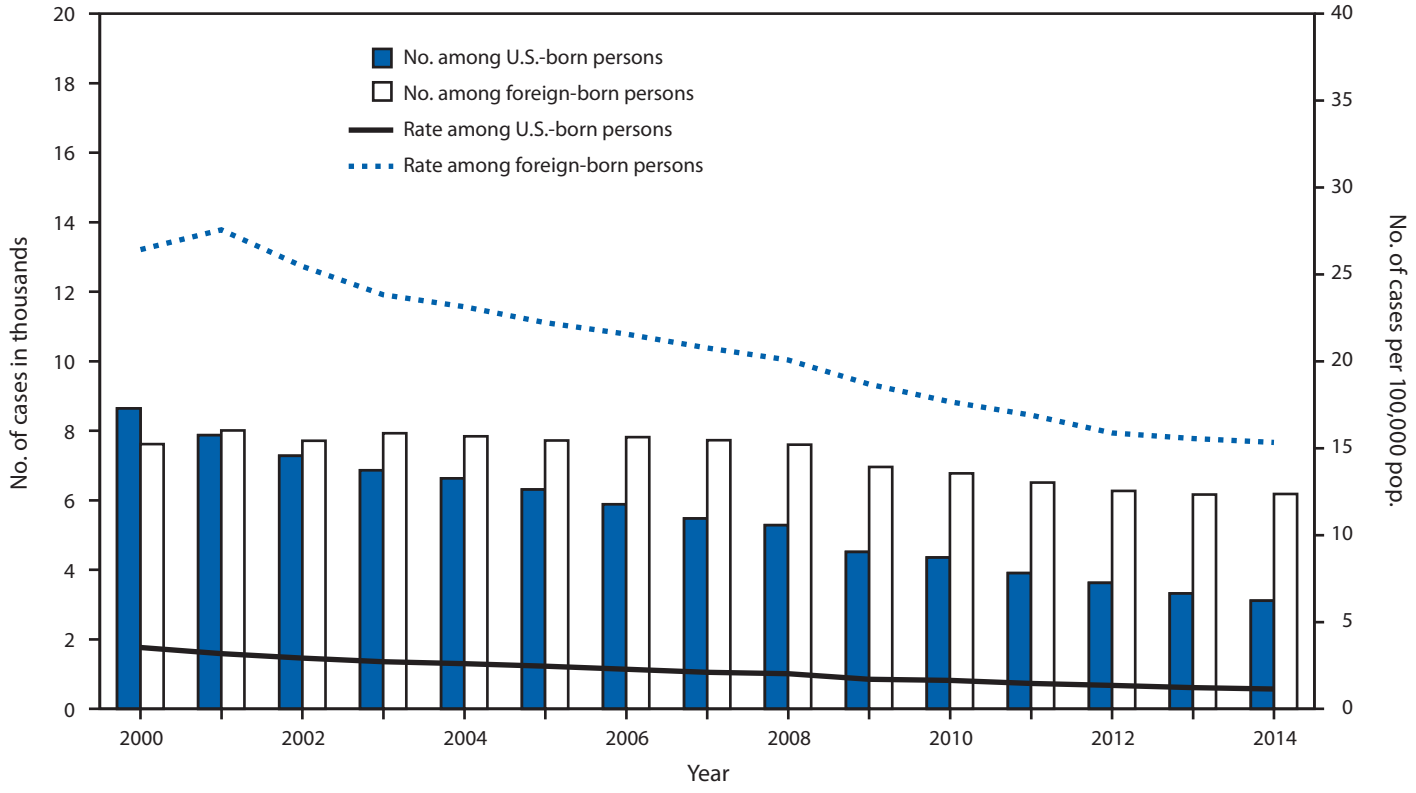


* Per 100,000 population.
† Data are provisional.

In 2014, the disparity in TB incidence between U.S.-born and foreign-born persons continued to increase. The total number of TB cases among foreign-born persons in the United States increased with a total of 6,181 TB cases reported (66.5% of all cases in persons with known national origin), representing a 1.5 percentage point increase from 65% in 2013. Despite the increased number of cases among the foreign born in 2014, the TB rate of 15.3 per 100,000 among foreign-born persons decreased 1.5% from 2013 because of an increase in the immigrant population. The 2014 rate among foreign-born persons represented a 42.0% decrease from the rate in 2000. In 2014, 55.3% of foreign-born persons with TB originated from five countries: Mexico (1,268 TB cases [20.6%]), the Philippines (745 [12.1%]), Vietnam (498 [8.1%]), India (472 [7.7%]), and China (420 [6.8%]).

Although the incidence rate among Asians continues to be the highest among all racial/ethnic groups (28.5 times higher than the incidence rate among whites), the incidence rate among Asians decreased from 18.6 per 100,000 in 2013 to 17.9 in 2014 (Table). From 2013 to 2014, TB rates among Hispanics

FIGURE 2. Number and rate* of newly diagnosed tuberculosis (TB) cases among U.S.-born and foreign-born persons, by year reported — United States, 2000–2014†



Source: National TB Surveillance System.
* Per 100,000 population.
† Data updated as of February 13, 2015. Data for 2014 are provisional.

remained relatively constant whereas rates decreased among blacks, whites, and Asians. Conversely, TB rates among persons in the "other" racial category (including American Indian/Alaska Native, Native Hawaiian or other Pacific Islander, and multiple race) increased from 3.8 in 2013 to 4.3 in 2014. Among persons with TB, 96% of Asians, 76% of Hispanics, 42% of blacks, and 23% of whites were foreign born. Among U.S.-born persons, blacks (36.4% [1,134 of 3,114]) were the racial/ethnic group with the greatest number of TB cases and the largest disparity compared with U.S.-born whites.

HIV status was known for 86% of TB cases reported in 2014. Among persons with TB who had a known HIV test result, 6.3% (506 of 8,072) had a positive test result for HIV infection.

Among persons aged ≥15 years with TB, 99% had known homelessness status, long-term care status, and incarceration status. Among persons aged ≥15 years with TB, 5.5% of whom reported being homeless within the past year, 2.2% were residing in a long-term care facility at the time of TB diagnosis, and 4.2% were confined to a detention or correctional facility at the time of TB diagnosis.

Drug-susceptibility test results for isoniazid and rifampin were reported for 97.8% and 97.4% of culture-confirmed TB cases in 2012 and 2013, respectively, the most recent years for which complete drug susceptibility data are available. The percentage of the 7,367 TB cases that were multidrug-resistant (MDR) TB** in 2013 remained stable at 1.3% (96 cases), compared with 1.1% (86 of 7,620 cases) in 2012. The percentage of MDR TB cases among persons without a previous history of TB has remained stable at approximately 1.0% since 1997. In 2013, foreign-born persons accounted for 87 (90.6%) of the 96 MDR TB cases. One case of extensively drug-resistant (XDR) TB†† was reported in 2014 compared with four cases in 2013 and two cases in 2012, but some final susceptibility test results are pending for 2014.

Discussion

Despite the continued decline in U.S. TB cases and rates since 1993, the 2.2% decrease from 2013 to 2014 to a rate of 3.0 per 100,000 still does not achieve the goal of TB elimination (1 case per 1,000,000) set in 1989 (*3*) and reaffirmed in 1999 (*4*). This decline in the rate of TB was the smallest decrease in more than a decade and suggests the need for ongoing evaluation of TB elimination strategies overall and within high-risk populations.

In 2014, the proportion of persons with TB who were foreign-born continued to increase. The higher proportion of TB cases occurring in foreign-born persons compared with U.S.-born persons illustrates the close relationship between the global TB burden and disease patterns in the United States. The established pattern of increasing proportions of TB cases occurring in the foreign-born population reaffirms the need to support and strengthen TB control efforts abroad, especially in the countries of origin of immigrants to the United States. This includes but is not limited to the countries contributing over half of the U.S. foreign-born patients in 2014 (i.e., China, India, Mexico, the Philippines, and Vietnam).

Additional efforts should also be made to prevent TB by finding and treating persons with latent *M. tuberculosis* infection (LTBI) among groups at high risk in the United States, including those who are foreign born (*5*). The majority of cases of TB disease that occur in foreign born patients result from

** Defined by the World Health Organization as a case of TB in a person with an *M. tuberculosis* isolate resistant to at least isoniazid and rifampin. Additional information available at http://whqlibdoc.who.int/publications/2010/9789241599191_eng.pdf.

†† Defined by the World Health Organization as a case of TB in a person with an *M. tuberculosis* isolate with resistance to at least isoniazid and rifampin among first-line anti-TB drugs, resistance to any fluoroquinolone (e.g. ciprofloxacin or ofloxacin), and resistant to at least one second-line injectable drug (i.e. amikacin, capreomycin, or kanamycin). Additional information available at http://whqlibdoc.who.int/publications/2010/9789241599191_eng.pdf.

TABLE. Number and rate* of tuberculosis cases and percentage change, by race/ethnicity — United States, 2013 and 2014†

	2013		2014		(%) change from 2013 to 2014	
Race/Ethnicity	**No.**	**Rate**	**No.**	**Rate**	**No.**	**Rate**
Hispanic	2,697	5.0	2,760	5.0	(2.3)	(0.5)
Non-Hispanic						
Black	2,089	5.3	1,996	5.1	(-4.5)	(-5.2)
Asian	2,989	18.6	2,961	17.9	(-0.9)	(-3.4)
White	1,424	0.7	1,247	0.6	(-12.4)	(-12.5)
Other§	341	3.8	401	4.3	(17.6)	(15.0)
Unknown	27	—	47	—	—	—
Total	**9,567**	**3.0**	**9,412**	**3.0**	**(-1.6)**	**(-2.2)**

* Per 100,000 population.
† Data for 2014 are provisional.
§ Includes persons reported as American Indian/Alaska Native (2014: 115 cases, rate = 4.9; 2013: 127 cases, rate = 5.5); Native Hawaiian or other Pacific Islander (2014: 94 cases, rate = 17.4; 2013: 60 cases, rate = 11.3); and of multiple races (2014: 192 cases, rate = 3.0; 2013: 154 cases, rate = 2.5).

What is already known on this topic?

The incidence of tuberculosis (TB) within the United States has been declining since 1993. An increasing proportion of cases are among foreign-born persons.

What is added by this report?

Provisional data for 2014 show the number of active TB cases newly reported in the United States was 9,412, with an incidence of 3.0 cases per 100,000 persons. This is a 2.2% decrease from the rate in 2013. The rate among foreign-born persons was 13.4 times higher than that for U.S.-born persons.

What are the implications for public health practice?

Continued vigilance, surveillance, and active prevention measures are needed to reach the TB elimination goal of <1 case per 1 million persons. To continue making strides toward elimination, alignment of domestic TB control activities with international TB control initiatives is needed to address increasing disparities between U.S.-born and foreign-born persons. Treatment of persons at high risk with latent *Mycobacterium tuberculosis* infection is also needed to address this disparity.

reactivation of LTBI rather than newly acquired infection (*6*). Although the high number of foreign-born persons living in the United States precludes testing every one of them, priority should be placed on those at highest risk for reactivation, such as those who underwent screening for TB overseas and were determined to have LTBI before arrival in the United States and those born in sub-Saharan Africa or Southeast Asia (*7*). Additionally, patients who are immunocompromised should undergo LTBI screening and receive treatment when appropriate (*5*).

Overall, 86% of TB cases in 2014 had known HIV status at TB diagnosis. All TB patients should have counseling and testing for HIV infection (*8*).

The findings in this report are subject to at least two limitations. First, reports of the number of TB cases and case rates for 2014 are provisional. Second, case rates are based on estimates of population denominators that might not all be recently updated. CDC's annual TB surveillance report will provide final TB case numbers and rates for 2014 later in 2015.

Continued progress toward TB elimination in the United States will require ongoing surveillance and improved TB control in groups at high risk, especially racial/ethnic minorities. Alignment of domestic TB control activities with international TB control initiatives is needed to address increasing disparities in TB rates between U.S.-born and foreign-born persons. Focused treatment of LTBI also is needed to prevent TB in all groups at high risk.

Acknowledgments

State and local TB control officials.

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HIV Infection and HIV-Associated Behaviors Among Persons Who Inject Drugs — 20 Cities, United States, 2012

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In the United States, an estimated 7% of new diagnoses of human immunodeficiency virus (HIV) infection in 2012 were attributed to injection drug use, and an additional 3% to male-to-male sexual contact and injection drug use (*1*). To monitor HIV prevalence and behaviors associated with HIV risk and prevention among persons who inject drugs (PWID), CDC's National HIV Behavioral Surveillance (NHBS) system conducts interviews and HIV testing in selected cities. This report summarizes HIV prevalence and behaviors among PWID interviewed and tested in 20 cities in 2012. Of the 10,002 PWID tested, 11% had a positive HIV test result. Among 9,425 PWID included in the behavioral analysis, 30% receptively shared syringes, 70% had vaginal sex without a condom, 25% had heterosexual anal sex without a condom, and 5% of males had male-to-male sexual contact without a condom in the previous 12 months. Fifty-one percent of PWID included in the behavioral analysis had been tested for HIV, 25% participated in an HIV behavioral intervention, and 39% participated in substance abuse treatment in the previous 12 months. Additional efforts are needed to reduce risk behaviors and increase access to HIV testing, drug treatment, and other HIV prevention programs to further reduce HIV infections among PWID.

In 2012, NHBS staff collected cross-sectional behavioral survey data and conducted HIV testing among PWID recruited using respondent-driven sampling* (*2–4*) in 20 cities† with high prevalence of acquired immunodeficiency syndrome (AIDS). Persons who volunteered to participate, were eligible§, and consented were administered a standardized, anonymous questionnaire face-to-face by trained interviewers. All participants were offered anonymous HIV testing, performed by collecting blood or oral specimens for either rapid testing in the field or laboratory-based testing. A nonreactive screening test result was considered HIV-negative; a reactive screening test result was considered HIV-positive if confirmed by Western blot or indirect immunofluorescence assay. Incentives were offered for interview completion, HIV testing, and recruitment.¶

PWID with HIV-positive test results during the survey were defined as aware of their HIV infection if they reported a previous HIV-positive test result. Because studies have found that knowledge of personal HIV status might influence risk behaviors (*5*), behavioral analysis was limited to participants who did not report a previous HIV-positive test result. Participants were asked whether they had, in the 12 months before the interview, engaged in high-risk injection or sex behaviors, been tested for HIV infection, or participated in an HIV behavioral intervention.** In addition, participants were asked whether they had ever been tested for HIV or hepatitis C virus (HCV) infection.†† Data from each city were analyzed using a respondent-driven sampling analysis tool that adjusted for differences in peer recruitment patterns and PWID network size and estimated 95% confidence intervals (CIs) using the Salganik bootstrap variance estimator (*6*). City-level analyses were aggregated and weighted by the estimated size of the PWID population in each city (*7*) to obtain estimates overall.§§

* Recruitment chains in each city began with three to 15 initial participants identified during formative assessment. Initial participants who completed the interview were asked to recruit up to five other PWID using a coded coupon system designed to track referrals. Referred and surveyed PWID were also asked to recruit up to five other PWID.

† State and local health departments eligible to participate in NHBS are among those whose jurisdictions include a metropolitan statistical area (MSA) or a specified division with high burden of acquired immunodeficiency syndrome. In 2012, NHBS was conducted in 20 MSAs/divisions. Throughout this report, MSAs and divisions are referred to as cities. The 20 cities were Atlanta, Georgia; Baltimore, Maryland; Boston, Massachusetts; Chicago, Illinois; Dallas, Texas; Denver, Colorado; Detroit, Michigan; Houston, Texas; Los Angeles, California; Miami, Florida; Nassau-Suffolk, New York; New Orleans, Louisiana; New York, New York; Newark, New Jersey; Philadelphia, Pennsylvania; San Diego, California; San Francisco, California; San Juan, Puerto Rico; Seattle, Washington; and Washington, District of Columbia.

§ Persons were eligible to participate if they had injected drugs during the previous 12 months, resided in the city, were aged ≥18 years, and could complete the interview in English or Spanish.

¶ The incentive format (cash or gift card) and amount varied by city based on formative assessment and local policy. A typical format included $25 for completing the interview, $25 for providing a specimen for HIV testing, and $10 for each successful recruitment (maximum of five).

** Receptive sharing of syringes was defined as "using needles that someone else had already injected with," and receptive sharing of injection equipment was defined as using equipment such as cookers, cottons, or water used to rinse needles or prepare drugs "that someone else had already used." Condomless vaginal sex/condomless anal sex was defined as "sex without a condom." Persons tested for HIV infection include those with results that were negative, indeterminate, or unknown. Participating in an individual or group HIV behavioral intervention (e.g., a one-on-one conversation with a counselor or an organized discussion regarding HIV prevention) did not include counseling received as part of an HIV test or conversations with friends. Male-to-male anal sexual contact was restricted to males and included both insertive and receptive anal sexual contact.

†† Testing for HCV infection was measured as ever tested or ever received a diagnosis of hepatitis C.

§§ For city-level estimates for which CIs could not be calculated, maximally wide CIs (0–1) were used in aggregation. City-level estimates with insufficient data for analysis were excluded from aggregation. Such estimates represented 4% of the estimates included in this analysis.

In 2012, a total of 13,093 persons were recruited to participate; of these, 2,812 (21%) were ineligible. An additional 279 (2%) eligible participants were excluded from analysis.¶¶ Data for the remaining 10,002 participants were used in the analysis of HIV prevalence (Table 1).

Among 10,002 PWID, 11% (CI = 9%–12%) tested positive for HIV. The percentage of PWID with HIV infection was higher among non-Hispanic blacks (16%) (CI = 13%–18%) than non-Hispanic whites (5%) (CI = 3%–7%). PWID in the South U.S. Census region had higher HIV prevalence (13%) (CI = 11%–16%) than those in the Midwest (8%) (CI = 5%–11%) and West regions (7%) (CI = 5%–10%). The prevalence of HIV infection was lower among PWID who most frequently inject heroin only (7%) (CI = 6%–9%) than among PWID who most frequently inject drugs other than heroin or multiple drugs (17%) (CI = 13%–21%). Prevalence of HIV infection was 27% (CI = 20%–33%) among male PWID who reported male-to-male sex in the previous 12 months. Among HIV-positive PWID, 63% (CI = 55%–70%) were aware of their infection.

Among the 9,425 PWID included in behavioral analysis, 30% (CI = 28%–32%) receptively shared syringes, 70% (CI = 68%–72%) had vaginal sex without a condom, 25% (CI = 23%–27%) had heterosexual anal sex without a condom, and 49% (CI = 47%–51%) had more than one opposite sex partner in the previous 12 months (Table 2). The percentages of PWID who receptively shared injection equipment or had more than one opposite sex partner in the previous 12 months were highest among PWID aged 18–29 years. Among male PWID, 10% (CI = 8%–11%) reported male-to-male sexual contact, and 5% (CI = 4%–6%) reported male-to-male sexual contact without a condom in the previous 12 months.

In addition, 25% (CI = 23%–27%) of PWID participated in an HIV behavioral intervention, 39% (CI = 36%–41%) participated in drug treatment, and 51% (CI = 49%–54%) had an HIV test in the previous 12 months (Table 3). Ever being tested for HCV was reported by 78% (CI = 76%–80%) of PWID.

PWID with health insurance were more likely to have been tested for HIV in the previous 12 months (55%) (CI = 53%–58%) than were PWID without health insurance (44%) (CI = 41%–47%) (Table 3).*** Similarly, more PWID with health insurance reported having participated in an HIV

TABLE 1. Estimated prevalence of HIV infection among persons who inject drugs (PWID), by selected characteristics — National HIV Behavioral Surveillance System, United States, 2012

	Overall*		HIV prevalence*	
Characteristic	**%**	**(95% CI)**	**%**	**(95% CI)**
Overall (N = 10,002)	**100**	**—**	**11**	**(9–12)**
Sex				
Men	68	(66–70)	10	(4–16)
Women	32	(30–34)	12	(9–15)
Race/Ethnicity				
Hispanic†	24	(22–26)	11	(6–15)
Black, non-Hispanic	41	(39–43)	16	(13–18)
White, non-Hispanic	30	(28–32)	5	(3–7)
Other§	5	(4–6)	—¶	—¶
Age group (yrs)				
18–29	13	(11–15)	1	(0–8)
30–39	18	(17–20)	6	(4–8)
40–49	27	(25–29)	18	(14–21)
≥50	42	(40–44)	11	(9–13)
Education				
Less than high school diploma	34	(32–36)	13	(11–16)
High school diploma	40	(38–42)	9	(7–12)
More than high school diploma	26	(24–28)	10	(6–13)
Health insurance				
Yes	69	(68–71)	13	(11–16)
No	31	(29–32)	5	(3–6)
Poverty level**				
At or below federal poverty level	79	(77–80)	12	(10–14)
Above federal poverty level	21	(20–23)	7	(4–9)
Drug injected most frequently				
Heroin only	67	(65–69)	7	(6–9)
Other/Multiple††	33	(31–35)	17	(13–21)
Male-male sex (among males only)				
Yes	12	(10–14)	27	(20–33)
No	88	(86–90)	8	(2–14)
Region§§				
Northeast	37	(24–51)	11	(7–15)
South	29	(15–42)	13	(11–16)
Midwest	8	(0–22)	8	(5–11)
West	24	(10–37)	7	(5–10)

Abbreviations: HIV = human immunodeficiency virus; CI = confidence interval.

* Percentages were weighted to adjust for differences in recruitment, the size of participant PWID peer networks, and the size of the PWID population in each city.

† Persons of Hispanic ethnicity might be of any race or combination of races.

§ Includes American Indian/Alaska Natives, Asians, Native Hawaiian or other Pacific Islanders, and persons of multiple races.

¶ Insufficient data.

** Poverty level is based on household income and household size.

†† Other drugs injected alone or two or more drugs injected with the same frequency.

§§ Northeast region includes the cities Boston, Massachusetts; Nassau-Suffolk, New York; New York, New York; Newark, New Jersey; and Philadelphia, Pennsylvania. South region includes Atlanta, Georgia; Baltimore, Maryland; Dallas, Texas; Houston, Texas; Miami, Florida; New Orleans, Louisiana; and Washington, DC. Midwest region includes Chicago, Illinois and Detroit, Michigan. West region includes Denver, Colorado; Los Angeles, California; San Diego, California; San Francisco, California; and Seattle, Washington. San Juan, Puerto Rico, was not included.

¶¶ Data from 279 participants were excluded because of missing recruitment data, lost data during electronic upload, incomplete survey data, survey responses with questionable validity, or invalid HIV test results, or because the participant could not be identified as male or female. Reasons for exclusion were not mutually exclusive.

*** Participants were asked whether they "currently have health insurance or health care coverage." Health insurance was defined for participants as "health plans people get through employment or purchased directly, as well as government programs like Medicare and Medicaid that provide medical care or help pay medical bills."

TABLE 2. Estimated percentage* of persons who inject drugs (PWID) who reported HIV-negative or unknown status and who engaged in behaviors† associated with HIV infection in the previous 12 months, by selected characteristics — National HIV Behavioral Surveillance System, United States, 2012

Characteristic	Receptive syringe sharing		Receptive injection equipment sharing		Had vaginal sex		Had condomless vaginal sex		Had heterosexual anal sex		Had condomless heterosexual anal sex		Had condomless heterosexual sex or receptive syringe sharing		Had more than one opposite sex partner	
	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
Overall (N = 9,425)	**30**	**(28–32)**	**55**	**(53–57)**	**82**	**(80–83)**	**70**	**(68–72)**	**31**	**(29–33)**	**25**	**(23–27)**	**77**	**(75–79)**	**49**	**(47–51)**
Sex																
Men	29	(27–31)	54	(51–56)	82	(80–84)	69	(67–72)	32	(30–34)	26	(24–29)	76	(74–78)	51	(48–53)
Women	34	(30–38)	57	(53–61)	80	(77–84)	72	(68–76)	28	(24–32)	22	(19–26)	79	(76–82)	46	(42–50)
Race/Ethnicity																
Hispanic§	32	(28–36)	53	(47–58)	86	(83–89)	73	(69–78)	40	(34–45)	34	(29–39)	81	(76–85)	48	(43–53)
Black, non-Hispanic	21	(18–23)	48	(45–51)	81	(78–83)	67	(64–70)	26	(24–29)	21	(18–23)	73	(70–76)	50	(47–53)
White, non-Hispanic	42	(37–46)	67	(63–71)	79	(76–83)	72	(68–76)	30	(27–34)	25	(21–28)	80	(76–84)	51	(47–55)
Other¶	29	(20–38)	53	(42–65)	82	(75–89)	73	(65–81)	27	(19–35)	22	(15–30)	81	(73–88)	48	(39–56)
Age group (yrs)																
18–29	40	(32–47)	73	(67–79)	94	(90–98)	86	(81–92)	43	(36–51)	38	(31–45)	91	(86–97)	68	(61–74)
30–39	40	(36–44)	61	(55–66)	90	(87–93)	80	(76–85)	40	(34–45)	31	(27–36)	85	(81–89)	56	(51–62)
40–49	31	(28–35)	57	(53–60)	82	(78–85)	70	(67–74)	33	(29–36)	27	(24–31)	79	(76–82)	48	(44–51)
≥50	23	(21–26)	47	(44–50)	73	(70–76)	60	(57–63)	22	(20–25)	17	(15–20)	68	(65–71)	42	(39–45)
Education																
Less than high school diploma	33	(30–36)	56	(52–60)	83	(80–85)	71	(68–74)	32	(29–35)	27	(23–30)	79	(77–82)	49	(46–53)
High school diploma	31	(28–34)	56	(52–59)	84	(81–87)	72	(69–75)	32	(29–36)	27	(24–30)	78	(75–81)	52	(48–55)
More than high school diploma	27	(23–30)	56	(52–60)	77	(74–81)	67	(63–71)	27	(24–31)	21	(18–24)	74	(70–77)	45	(41–49)
Health insurance																
Yes	29	(27–32)	54	(52–57)	80	(78–83)	68	(66–71)	30	(27–33)	25	(22–28)	75	(73–78)	46	(43–49)
No	32	(29–35)	56	(52–59)	84	(82–87)	76	(73–78)	32	(29–35)	26	(23–29)	81	(79–84)	55	(52–58)
Poverty level**																
At or below federal poverty level	31	(29–33)	54	(52–57)	81	(79–83)	70	(68–72)	31	(29–33)	26	(23–28)	77	(75–79)	49	(47–52)
Above federal poverty level	29	(25–33)	56	(52–60)	82	(78–85)	70	(66–74)	30	(26–34)	23	(20–27)	76	(72–80)	48	(44–53)
Drug injected most frequently																
Heroin only	30	(28–32)	54	(51–56)	82	(80–84)	71	(69–73)	29	(27–32)	24	(22–27)	79	(77–81)	46	(43–49)
Other/Multiple††	31	(28–34)	57	(53–61)	83	(80–86)	70	(67–74)	36	(32–39)	28	(24–31)	78	(74–82)	58	(54–62)
Region§§																
Northeast	34	(30–37)	55	(50–59)	85	(82–88)	74	(70–78)	37	(33–41)	31	(26–35)	80	(77–84)	52	(48–57)
South	28	(25–31)	56	(52–59)	82	(79–85)	68	(65–71)	28	(25–32)	23	(20–26)	75	(72–78)	52	(48–55)
Midwest	20	(14–25)	45	(39–51)	83	(78–88)	73	(67–78)	20	(15–25)	17	(12–22)	75	(70–81)	42	(35–48)
West	32	(28–36)	57	(53–61)	76	(73–79)	67	(64–71)	26	(23–30)	22	(19–26)	75	(72–78)	43	(39–47)

Abbreviations: HIV = human immunodeficiency virus; CI = confidence interval.

* Percentages were weighted to adjust for differences in recruitment, the size of participant PWID peer networks, and the size of the PWID population in each city.

† Receptive sharing of syringes was defined as "using needles that someone else had already injected with," and receptive sharing of injection equipment was defined as using equipment such as cookers, cottons, or water used to rinse needles or prepare drugs "that someone else had already used." Condomless vaginal sex/Condomless anal sex was defined as "sex without a condom."

§ Persons of Hispanic ethnicity might be of any race or combination of races.

¶ Includes American Indian/Alaska Natives, Asians, Native Hawaiian or other Pacific Islanders, and persons of multiple races.

** Poverty level is based on household income and household size.

†† Other drugs injected alone or two or more drugs injected with the same frequency.

§§ Northeast region includes the cities Boston, Massachusetts; Nassau-Suffolk, New York; New York, New York; Newark, New Jersey; and Philadelphia, Pennsylvania. South region includes Atlanta, Georgia; Baltimore, Maryland; Dallas, Texas; Houston, Texas; Miami, Florida; New Orleans, Louisiana; and Washington, DC. Midwest region includes Chicago, Illinois and Detroit, Michigan. West region includes Denver, Colorado; Los Angeles, California; San Diego, California; San Francisco, California; and Seattle, Washington. San Juan, Puerto Rico, was not included.

behavioral intervention (27%) (CI = 24%–30%) or having ever been tested for HCV (81%) (CI = 79%–84%) than did PWID without health insurance (HIV behavioral intervention: 20% [CI = 17%–22%]; HCV test: 73% [CI = 70%–76%]).

The change in the percentage of PWID with HIV infection from 2009 (9%) to 2012 (11%) was not statistically significant. Among PWID with HIV-positive test results in 2012, 63% were aware of their infection, which is not significantly

TABLE 3. Estimated percentage* of persons who inject drugs (PWID) who reported HIV-negative or unknown status and who received testing and prevention services, by selected characteristics — National HIV Behavioral Surveillance System, United States, 2012

Characteristics	Was tested for HIV infection in the previous 12 months		Participated in HIV behavioral interventions in the previous 12 months†		Was ever tested for hepatitis C§	
	%	(95% CI)	%	(95% CI)	%	(95% CI)
Overall (N = 9,425)	**51**	**(49–54)**	**25**	**(23–27)**	**78**	**(76–80)**
Sex						
Men	50	(47–53)	24	(22–26)	78	(76–80)
Women	55	(51–58)	26	(22–30)	79	(76–82)
Race/Ethnicity						
Hispanic¶	56	(51–61)	26	(21–31)	79	(74–84)
Black, non-Hispanic	54	(51–57)	23	(21–26)	76	(74–79)
White, non-Hispanic	45	(41–49)	24	(20–27)	83	(80–86)
Other**	47	(38–57)	31	(20–42)	85	(78–91)
Age group (yrs)						
18–29	54	(47–61)	25	(20–31)	76	(71–82)
30–39	58	(54–62)	27	(22–32)	79	(75–83)
40–49	56	(52–59)	28	(24–32)	79	(76–82)
≥50	48	(45–51)	22	(19–24)	79	(77–82)
Education						
Less than high school diploma	52	(49–56)	25	(21–28)	77	(74–80)
High school diploma	51	(47–54)	23	(20–26)	77	(74–80)
More than high school diploma	52	(48–56)	26	(22–30)	82	(79–85)
Health insurance						
Yes	55	(53–58)	27	(24–30)	81	(79–84)
No	44	(41–47)	20	(17–22)	73	(70–76)
Poverty level††						
At or below federal poverty level	51	(49–54)	25	(22–27)	78	(75–80)
Above federal poverty level	51	(47–55)	25	(21–28)	82	(79–85)
Drug injected most frequently						
Heroin only	51	(48–53)	25	(22–27)	80	(77–82)
Other/Multiple§§	55	(51–58)	25	(22–29)	76	(72–80)
Region¶¶						
Northeast	54	(49–58)	27	(23–31)	80	(76–84)
South	55	(52–58)	21	(18–24)	75	(72–78)
Midwest	48	(42–54)	28	(23–34)	76	(70–82)
West	45	(41–49)	24	(20–28)	82	(78–85)

Abbreviations: HIV = human immunodeficiency virus; CI = confidence interval.

* Percentages were weighted to adjust for differences in recruitment, the size of participant PWID peer networks, and the size of the PWID population in each city.

† Participating in an individual or group HIV behavioral intervention (e.g., a one-on-one conversation with a counselor or an organized discussion regarding HIV prevention) did not include counseling received as part of an HIV test or conversations with friends.

§ Testing for hepatitis C virus infection was measured as ever tested or ever received a diagnosis of hepatitis C. All other behaviors are reported for the previous 12 months.

¶ Persons of Hispanic ethnicity might be of any race or combination of races.

** Includes American Indian/Alaska Natives, Asians, Native Hawaiian or other Pacific Islanders, and persons of multiple races.

†† Poverty level is based on household income and household size.

§§ Other drugs injected alone or two or more drugs injected with the same frequency.

¶¶ Northeast region includes the cities Boston, Massachusetts; Nassau-Suffolk, New York; New York, New York; Newark, New Jersey; and Philadelphia, Pennsylvania. South region includes Atlanta, Georgia; Baltimore, Maryland; Dallas, Texas; Houston, Texas; Miami, Florida; New Orleans, Louisiana; and Washington, DC. Midwest region includes Chicago, Illinois and Detroit, Michigan. West region includes Denver, Colorado; Los Angeles, California; San Diego, California; San Francisco, California; and Seattle, Washington. San Juan, Puerto Rico, was not included.

different from that found in 2009 (55%) (*4*). The percentages of PWID who engaged in risk behaviors in 2012 also were consistent with 2009 data (*4*).

Discussion

The 2012 data in this report provide updated estimates of the prevalence of HIV infection and behaviors since the last NHBS survey of PWID in 2009 (*4*). The change in the percentage of PWID with HIV infection from 2009 to 2012 was not statistically significant. The percentage of PWID with HIV-positive test results who were aware of their infection in 2012 also was not significantly different from that found in 2009 (*4*).

The percentages of PWID who engaged in risk behaviors in 2012 are consistent with 2009 data (*4*). These percentages highlight a role for expanded HIV testing and prevention among PWID. The high-risk behaviors observed among

PWID represent an opportunity to prevent future increases in HIV infections caused by sharing injection equipment or having sex without a condom.

Compared with the last NHBS survey of PWID in 2009, higher percentages of participants in this 2012 study reported participating in HIV behavioral interventions in the previous 12 months (25% in 2012 compared with 19% in 2009) and having ever been tested for HCV infection (78% and 72%, respectively) (*4*). Similar percentages of PWID reported being tested for HIV in the previous 12 months (51% and 49%, respectively).

This analysis found that PWID with health insurance were more likely to have been tested for HIV infection in the previous 12 months, to have participated in an HIV behavioral intervention in the previous 12 months, and to have ever been tested for HCV than were PWID without health insurance. These differences suggest that expanding health insurance coverage might allow more PWID to become aware of their HIV and HCV status and to have access to important treatment and prevention interventions.

Consistent with previous reports (*4*,*8*), this analysis found that younger PWID were more likely to have shared injection equipment or have had more than one opposite sex partner in the previous 12 months than were older PWID. The percentages of PWID who were tested for HIV infection or participated in an HIV behavioral intervention were similar among younger and older PWID.

The findings in this report are subject to at least four limitations. First, some participants might not have accurately reported their behavior to interviewers, and results might be affected by social desirability bias. Second, because no method of obtaining standard probability samples of PWID exists, the representativeness of the NHBS sample cannot be determined. Although respondent-driven sampling adjusts for some sampling biases (*2*), biases related to participants' recruitment behavior or their willingness and ability to participate in the interview might have affected the sample. Third, the numbers of participants in some cities were insufficient to permit every estimate to be made in every city. Finally, PWID were interviewed in 20 cities with high AIDS prevalence; findings from these cities might not be generalizable to other cities or states.

To reduce the number of new HIV infections, the National HIV/AIDS Strategy[†††] calls for intensifying prevention efforts in communities where HIV is most heavily concentrated. At the center of any response to HIV among PWID is a comprehensive, multifaceted prevention strategy, which includes access to sterile injection and drug preparation equipment; treatment for substance use and mental disorders; opioid substitution therapy; counseling, testing, and treatment for HIV infection; education on drug-related and sex-related risks and risk-reduction for PWID and their sex partners; and preexposure prophylaxis for adult PWID at substantial risk for HIV acquisition (*9*,*10*). An effective prevention approach for PWID also includes prevention and treatment of other infections, including HCV; thus, integration of multiple service programs for PWID might increase the effectiveness of HIV prevention efforts (*9*).

What is already known on this topic?

Persons who inject drugs (PWID) in the United States are at increased risk for acquiring human immunodeficiency virus (HIV) infection. In 2009, the National HIV Behavioral Surveillance (NHBS) system, which uses respondent-driven sampling to interview and test for HIV infection PWID living in 20 large cities, found an overall HIV prevalence of 9%.

What is added by this report?

The NHBS in 2012 found an HIV prevalence of 11% (95% confidence interval = 9%–12%) among PWID; of those, 63% had been previously aware of their infection, compared with 55% in 2009, not a statistically significant difference. Among PWID reporting negative or unknown HIV status in 2012, 30% reported sharing syringes, and 70% reported having vaginal sex without a condom in the previous 12 months.

What are the implications for public health practice?

Many PWID are at risk for acquiring HIV infection because of their drug use practices and sexual behaviors, but more than one third of HIV-positive PWID in urban areas with high HIV prevalence were unaware of their infection. Additionally, three quarters of PWID had not participated in an HIV behavioral intervention in the previous 12 months. To prevent infections, PWID need ready access to sterile injection and drug preparation equipment; treatment for substance use and mental disorders; opioid substitution therapy; counseling, testing, and treatment for HIV infection; education on drug-related and sex-related risks and risk-reduction; and preexposure prophylaxis if they are adults and at substantial risk for acquiring HIV infection.

[†††] Additional information available at http://www.whitehouse.gov/administration/eop/onap.

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Healthful Food Availability in Stores and Restaurants — American Samoa, 2014

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American Samoa, one of the U.S.-affiliated Pacific Islands, has documented the highest prevalence of adults with obesity (75%) in the world (*1*). The nutritionally poor food and beverage environment of food retail venues has been suspected to be a contributing factor (*2*), although an evaluation of these venues in American Samoa has not been conducted. In January 2014, American Samoa established an Obesity Task Force to develop policies and strategies to combat obesity. To inform the efforts of the task force, the American Samoa Department of Health and CDC conducted a baseline assessment of the availability, pricing, and promotion of healthful foods at retail food venues. Previously validated food environment assessment tools were modified to incorporate American Samoa foods and administered in a geographically representative sample of 70 stores (nine grocery stores and 61 convenience stores) and 20 restaurants. In convenience stores, healthful items were not found as available as less healthful counterparts, and some healthful items were more expensive than their less healthful counterparts. For restaurants, 70% offered at least one healthful entrée, whereas only 30% had healthful side dishes, such as vegetables. Actions to promote healthy eating, such as providing calorie information, were rare among restaurants. Improving availability, affordability, and the promotion of healthful foods in American Samoa stores and restaurants could support healthy eating among American Samoa residents.

American Samoa consists of five islands and two coral atolls with 54,517 residents in 2014; most residents are Native Hawaiian or other Pacific Islander (91.6%) (*3*). American Samoa and other Pacific Islands have unique food environments that rely heavily on imported foods (*4*). On average, freighters carrying imported foods arrive in American Samoa approximately twice a month (Personal communication, Va'a Tofaeono, Program Coordinator, American Samoa Department of Health). Given that most imported foods are transported by sea, they are often processed to prolong their shelf lives. In addition, the variety of products that are imported is limited (*4*).

To identify retail food sources, a pair of two-person teams canvassed Tutuila Island by car and foot, visually inspecting and identifying the location and business status (i.e., in-business, out-of-business, or under renovation) of all retail food vendors. Tutuila Island was selected for data collection because it is the home of over 95% of the American Samoa population. North American Industry Classification System (NAICS) code definitions were used to define grocery stores, convenience stores, and restaurants.* Stores with more than two cash registers were classified as grocery stores, and stores with only one cash register were classified as convenience stores (*5*). A total of 12 grocery stores, 110 convenience stores, and 48 restaurants were identified. A geographically representative sample of 70 stores (nine grocery stores and 61 convenience stores) and 20 restaurants were selected for assessment.

Previously validated nutrition environment survey instruments for stores (Nutrition Environment Measures Surveys-Stores or NEMS-S) and restaurants (Nutrition Environment Measures Surveys-Restaurants or NEMS-R)† were modified to reflect foods available in American Samoa to assess the availability, pricing, and promotion of more healthful foods. Descriptive statistics were used to estimate the frequency of product availability, pricing, and promotion information for healthful and less healthful foods items in stores and restaurants. More healthful food items were defined according to NEMS-S and NEMS-R criteria, augmented by the Dietary Guidelines for Americans for 2010.§ Food items were classified as healthful without a corresponding less healthful counterpart (e.g., fresh fruits, fresh vegetables, frozen fruits, frozen vegetables, canned fruits, canned vegetables, and canned beans) or more healthful food items that have a corresponding less healthful counterpart (e.g., lean meats [≤10% fat ground beef], low sugar cereals [<7g sugars per serving], whole grain breads, reduced-fat dairy products, and canned soup [≤100 kcal per serving]). More healthful beverages were defined as low-fat or skim milk, 100% fruit juice, zero-calorie sodas, and bottled water.

Findings showed that fresh fruits and vegetables were available more often in grocery stores than convenience stores but prices were comparable (e.g., availability of Chinese cabbage was 100% and the average price was $1.32/lb [$2.91/kg] in grocery stores versus 38% and an average price of $1.38/lb [$3.04/kg] in convenience stores) (Table 1). In convenience stores, more healthful items were not available as often as corresponding less healthful items (e.g., lean ground beef was available in no stores versus regular ground beef available in 45 [74%] stores). Some more healthful items were more expensive on average than their corresponding less healthful counterparts

* Available at http://www.census.gov/mrts/www/naicsdef.html.
† Available at http://www.med.upenn.edu/nems/measures.shtml.
§ Available at http://www.health.gov/dietaryguidelines/2010.asp.

TABLE 1. Availability and mean prices of fruits and vegetables in nine grocery stores* and 61 convenience stores† — American Samoa, April 2014

Type of food (unit price)	Availability		Price (U.S. $)	
	Grocery stores	Convenience stores	Grocery stores	Convenience stores
	%	%	Mean	Mean
Any fresh fruit	100	74	—	—
Top-selling fruits				
Oranges (1lb [454 g])	100	70	1.53	1.56
Apples (1lb [454 g])	89	52	1.60	1.73
Any fresh vegetables	100	93	—	—
Top-selling vegetables				
Carrots (1lb [454 g])	100	72	1.04	1.25
Chinese cabbage (bag§)	100	38	1.32	1.38
Chinese long beans (bag§)	89	49	1.40	1.39

* Stores with more than one cash register.
† Stores with one cash register.
§ Each bag weighed approximately 1 lb (454 g).

TABLE 2. Availability and mean prices of selected more healthful and less healthful food items in 61 convenience stores — American Samoa, April 2014

Type of food (unit price)	Availability		Price (U.S. $)	
	Less healthful	More healthful	Less healthful	More healthful
	%	%	Mean	Mean
Meats and cheese				
Ground beef (1lb [454 g])	74	0	3.14	—
Canned meats (7 oz [198 g])	98	98	2.39	1.82
Hot dogs (12 oz [340 g])	69	89	1.22	1.29
Cheese (10 oz [283 g])	79	0	1.97	—
Beverages				
Soda (12 oz [355 mL])	98	74	0.75	0.75
Juice (16 oz [473 mL])	93	66	1.15	1.44
Bottled water (17 oz [500ml])	0	98	—	1.00
Bread and cereal				
Bread (1lb [454 g])	80	39	1.12	1.88
Cereal (12 oz [340 g])	95	62	4.49	4.65

(e.g., $1.88 for 100% whole-wheat bread versus $1.12 white bread) (Table 2).

Among restaurants, 14 (70%) offered at least one healthful entrée but only six (30%) had healthful side dishes such as vegetables. When available, healthful entrées were, on average, 9% more expensive than less healthful entrées ($7.47 versus $6.83; [n = 14]) and healthful sides were, on average 15% more expensive than less healthful sides ($4.51 versus $3.91; [n = 6]). Educational or promotional factors to encourage healthful eating, such as calorie counts, other nutrition information, or menu notations encouraging healthy substitutions, were available in approximately 5% of surveyed restaurants.

Discussion

Overall, findings in the American Samoa stores were comparable with those from studies conducted in stores in the continental United States (including in urban and rural environments), showing that more healthful items were limited in convenience stores. For example, an assessment conducted in low-income urban neighborhoods of Philadelphia in 2011 (*6*) found that just over half of surveyed convenience stores sold whole grain bread (56%); similarly, low availability of whole grain breads was found in American Samoa (39%). In American Samoa, the average prices of the commonly available fruits and vegetables were comparable in grocery and convenience stores. In the continental United States, fresh fruits and vegetables were often more expensive in convenience stores than grocery stores (*7*). Possible reasons for this discrepancy are that most American Samoan convenience stores had a refrigeration system and some fruits and vegetables were obtained locally (e.g., Chinese long beans and cabbage). A refrigeration system extends the shelf-life of certain types of fresh fruits and vegetables, which can impact variety, quality, waste, and the pricing of products. Many convenience store managers in the continental United States perceive lack of refrigeration options in smaller stores as a barrier to selling more healthful foods (*8*).

The restaurant findings in this assessment were similar to other studies conducted in the continental United States that showed that more healthful items were less available and promotions were limited (*9*), indicating opportunities to improve healthful item availability and promotion in American Samoa. For example, an assessment conducted in a rural community in Minnesota in 2011 found that 4% of restaurants highlighted healthy options, similar to restaurants in American Samoa (5%) (*10*). Using these findings, the American Samoa Department of Health initiated conversations with the owners of restaurants that offer more healthful items and is identifying ways to promote those restaurants to consumers.

The findings in this report are subject to at least four limitations. First, although the sample was geographically representative, it was not a random sample because stores in remote villages were included at the request of the American Samoa Department of Health. Second, this assessment covered only Tutuila Island, excluding the other four islands and two atolls; however, Tutuila Island accounts for >95% of the American Samoa population. Third, although the assessment tool covered many of the more healthful items available in stores, some items, such as dried legumes and brown rice, were not included. Finally certain types of healthful traditional foods such as papayas and bananas were often sold by roadside vendors but not included in this assessment.

What is already known on this topic?

American Samoa has the highest prevalence of obesity (75%) globally. A nutritionally poor food and beverage environment of food retail venues has been suspected to be a community-level predictor of obesity.

What is added by this report?

In April 2014, separate store and restaurant Nutrition Environment Measurement Surveys found that healthful foods in American Samoan stores and restaurants were infrequently available, often cost more, and were promoted less.

What are the implications for public health practice?

Potential action items include reviewing existing policies that facilitate or pose barriers to healthful food distribution to American Samoa stores and restaurants and encouraging stores and restaurants to incorporate affordable local ingredients such as locally grown vegetables to avoid high shipping costs.

CDC is collaborating with the American Samoa Department of Health to develop a comprehensive report that will summarize the findings to inform the task force's efforts. Potential action items include reviewing existing policies that facilitate or pose barriers to more healthful food distribution and establishing commitments from vendors to incorporate more affordable local ingredients, such as locally grown vegetables, to avoid high shipping costs.

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Notes from the Field

Fatal Yellow Fever Vaccine–Associated Viscerotropic Disease — Oregon, September 2014

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In September 2014, a previously healthy Oregon woman in her 60s went to a hospital emergency department with malaise, dyspnea, vomiting, and diarrhea of 3–5 days' duration. She reported no recent travel, ill contacts, or dietary changes. Six days earlier, she had received a single dose of yellow fever vaccine and typhoid vaccine before planned travel to South America.

In the emergency department, the woman was afebrile but tachycardic and weak. Initial laboratory reports included a white blood cell count of 4,400/μL (reference range [RR] = 4,800–10,800/μL), platelet count of 84,000/μL (RR = 150,000–400,000/μL), potassium level of 2.8 mmol/L (RR = 3.5–5.1 mmol/L), and calcium level of 8.0 mg/dL (RR = 8.6–10.0 mg/dL). She was admitted to the hospital with diagnoses of gastroenteritis, malaise, dyspnea, and thrombocytopenia. Within 10 hours of admission, she experienced acute respiratory failure requiring intubation and mechanical ventilation. Contrast chest computed tomography indicated a substantial mediastinal mass. The patient experienced cardiogenic shock and acute renal failure and died 3 days after admission. At autopsy, the thymus was diffusely enlarged, consistent with thymoma. The concentration of acetylcholine receptor binding antibody in blood collected 1 day before death was 0.88 nmol/L (RR = ≤0.02 nmol/L), indicative of myasthenia gravis.

Tissue and serum samples were tested at CDC for evidence of yellow fever vaccine–associated viscerotropic disease (YEL-AVD), a serious adverse reaction resulting from the uncontrolled replication of vaccine virus and characterized by multisystem organ dysfunction; 60% of reported cases are fatal (*1*). Immunohistochemical staining indicated yellow fever virus antigen in tissue samples from various organs (Figure). Reverse transcription–polymerase chain reaction detected yellow fever vaccine viral RNA in multiple organs and in a serum sample that had been collected 2 days before death. Additionally, a serum sample obtained 1 day before death demonstrated evidence of yellow fever immunoglobulin M, with a yellow fever virus–specific neutralizing antibody titer of 640. Testing of yellow fever viral RNA from the vaccine lot used to vaccinate the woman identified sequences consistent with known vaccine strains without any notable mutations.

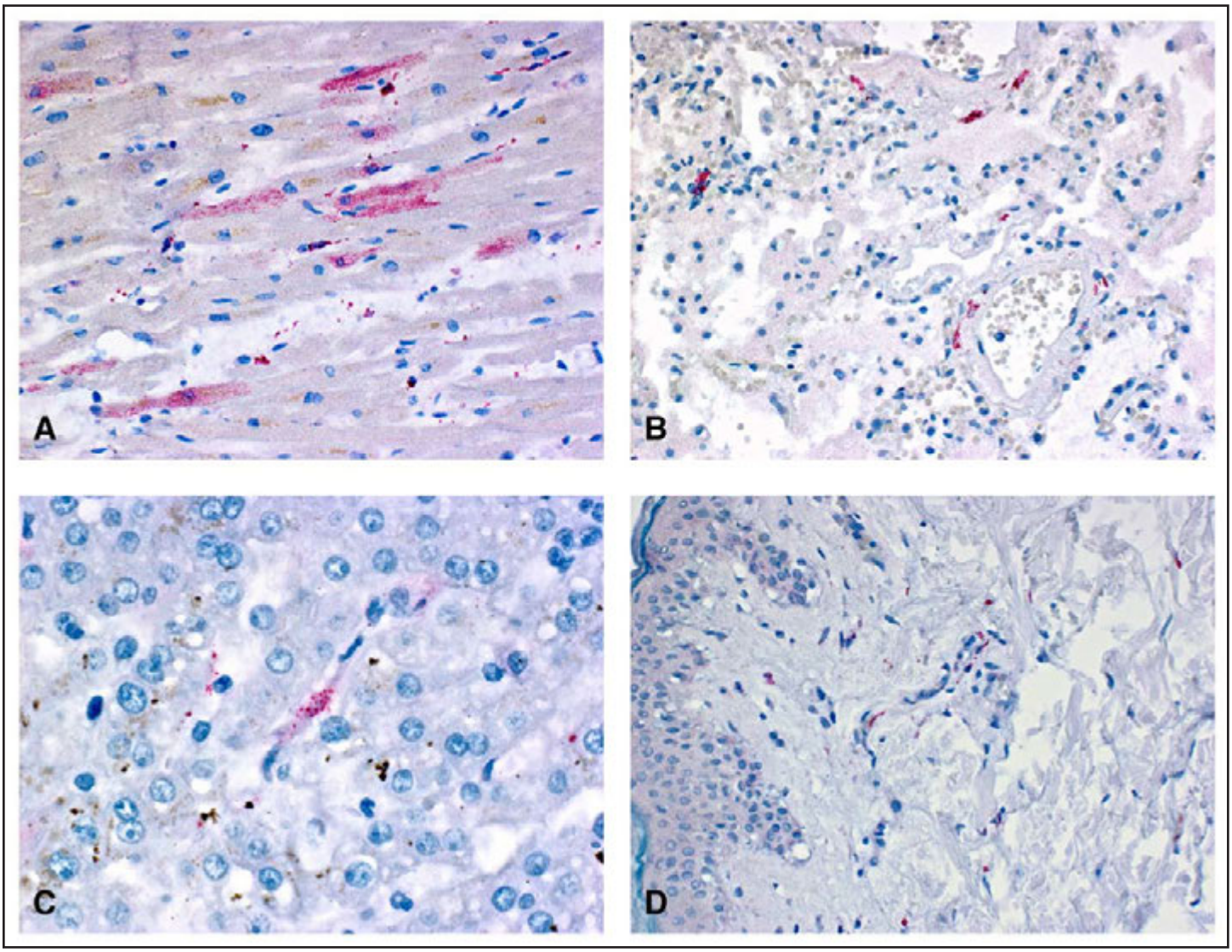
The patient's clinical course and laboratory results, including her requirement for mechanical ventilation, platelets <100,000/μL, hypotension requiring vasopressor drugs to maintain systolic blood pressure, and increase in creatinine to ≥1.5 times the upper limit of normal, met Level 1 diagnostic certainty for viscerotropic disease. The temporal relationship between yellow fever vaccination and development of symptoms was consistent with YEL-AVD (*1*). The presence of yellow fever virus–specific antigen in multiple organs demonstrated by immunohistochemistry, in addition to amplification of yellow fever 17D viral RNA from tissue, met criteria for definite yellow fever vaccine–associated causality (*1*). Both her age at vaccination and occult thymic disease likely predisposed this patient to YEL-AVD development.

The risk for YEL-AVD in the United States is approximately 0.4 cases per 100,000 doses of yellow fever vaccine distributed; older age and thymic disease have been associated with an increased risk for YEL-AVD (*2*). Risk increases to one case per 100,000 doses of yellow fever vaccine distributed for travelers aged ≥60 years and 2.3 cases per 100,000 doses for those aged ≥70 years (*3*). Of the first 23 YEL-AVD cases described, four (17%) were in patients who had a history of thymoma (*4*). Risk related to thymic disease might persist even after thymus resection (*4*). The incidence of thymoma in the United States is approximately 0.13 per 100,000 person-years, increasing with age and peaking among persons aged ≥60 years. Approximately one third of thymomas are diagnosed among asymptomatic patients on the basis of abnormal chest radiographs or computed tomography (*5*); 10%–20% of patients with myasthenia gravis have a thymoma, and approximately 30% of patients with thymoma have thymoma-associated myasthenia gravis (*6*).

Although yellow fever vaccination would have been contraindicated in this patient had it been known that she had a thymoma or myasthenia gravis, there is no national recommendation for routine screening for thymic disease before receipt of yellow fever vaccine. This appears to be the first published report on a case of YEL-AVD in a person with undiagnosed thymoma since the package insert for yellow fever vaccine available in the United States was updated to include a history of thymus disorder as a contraindication to vaccine administration in 2003 (*2*).

Although most persons have no or mild adverse events after yellow fever vaccination, the benefits of vaccination among travelers who have a limited exposure period need to be weighed against risk for adverse events (*2,7*). Yellow fever can range in severity from a mild febrile illness to severe disease with jaundice and hemorrhage; the case-fatality ratio

FIGURE: Yellow fever virus antigens (red) detected after immunohistochemical staining in tissue samples from various organs* of a patient who died from yellow fever vaccine–associated viscerotropic disease — Oregon, September 2014



* Sample A: myocytes in heart; sample B: fibroblasts in vascular wall in lung; sample C: kupffer cell in liver; sample D: fibroblasts and histiocytes in skin. (Immunoalkaline phosphatase with naphthol fast-red substrate and hematoxylin counterstain. Original magnifications: A = x400; B = x100; C = x400; D = x100.)

for severe yellow fever disease is 20%–50% (*7*). An estimated 200,000 yellow fever cases occur worldwide annually, with approximately 87% in Africa (*2*). The live, attenuated vaccine is recommended for persons living in or traveling to tropical South America and sub-Saharan Africa (*1*); proof of yellow fever vaccination can be required for entry into certain countries. When determining whether a patient should receive yellow fever vaccine, the patient and clinician should discuss the risk for travel-associated yellow fever disease as indicated by season, destinations and duration of travel, likelihood of exposure to mosquitoes while traveling, and vaccination status, and weigh them against risks associated with vaccination.

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Acknowledgments

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Notes from the Field

Listeriosis Associated with Stone Fruit — United States, 2014

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On July 19, 2014, a packing company in California (company A) voluntarily recalled certain lots of stone fruits, including whole peaches, nectarines, plums, and pluots, because of concern about contamination with *Listeria monocytogenes* based on internal company testing (*1*). On July 31, the recall was expanded to cover all fruit packed at their facility during June 1–July 17 (*2*). After the initial recall, clinicians, state and local health departments, CDC, and the Food and Drug Administration (FDA) received many inquiries about listeriosis from concerned consumers, many of whom had received automated telephone calls informing them that they had purchased recalled fruit. During July 19–31, the CDC *Listeria* website received >500,000 page views, more than seven times the views received during the previous 52 weeks. However, no molecular information from *L. monocytogenes* isolates was available to assess whether human illnesses might be linked to these products.

In early August 2014, a two-enzyme pulsed-field gel electrophoresis (PFGE) pattern shared by three *L. monocytogenes* isolates from stone fruit associated with the recall was uploaded to PulseNet, the national molecular subtyping network for foodborne disease surveillance. Four human isolates with isolation dates during the period May 8–July 8, 2014 (Illinois, Massachusetts, and South Carolina) and August 28 (Minnesota) were identified that had PFGE patterns indistinguishable from isolates from company A stone fruit. Samples of stone fruits from company A collected after the recall yielded an additional 31 *L. monocytogenes* isolates, 22 of which were indistinguishable from the initial isolates by PFGE; three other PFGE patterns were identified that did not match any isolates from clinical specimens collected during May 1–August 31. Whole-genome sequencing (WGS) analysis by whole-genome multilocus sequence typing showed that isolates from the Massachusetts and Minnesota patients were highly related (<10 allele differences and <10 high-quality single nucleotide polymorphism differences) to the isolates from recalled stone fruits, whereas the Illinois and South Carolina isolates were not (Figure).

A review of the standardized *Listeria* Initiative exposure questionnaire (*3*) for the Massachusetts patient showed that organic nectarine consumption was recorded, although the form does not specifically ask about stone fruit consumption. A subsequent interview using a questionnaire with questions about stone fruits indicated that the patient consumed nectarines and peaches purchased from stores that sold company A stone fruit. Traceback using receipts and shopper card data indicated the patient's family purchased recalled fruit. An interview with a family member of the Minnesota patient revealed that the patient consumed peaches from a store that received company A stone fruit; however, dates from receipts indicated that the peaches were purchased after the recalled fruit was reported to have been removed from the shelves. After removal of recalled fruit, the store received company A peaches that were not part of the recall as well as peaches from another California supplier. The South Carolina patient reportedly did not eat stone fruit before becoming ill. Family of the Illinois patient could not be reached for interview.

Strong evidence linked the Massachusetts case to recalled stone fruit, including food exposure interviews, receipt and shopper card data, and WGS results showing very high genetic relatedness between the patient's isolate and isolates from nectarines. Consumption data and WGS results suggest that stone fruit was also the likely source of *L. monocytogenes* infection in the Minnesota case; however, the later dates of illness onset and fruit purchase suggest that the patient consumed stone fruit that was not included in the recall.

This is the first reported link between human listeriosis and stone fruit. WGS results provided a basis for focusing resources for extended case interviews and follow-up. Specifically, among cases that matched the recalled stone fruit by PFGE, WGS allowed differentiation between sporadic cases and cases associated with stone fruit consumption.

Reported listeriosis is much more common in pregnant women than in the general population and can cause major fetal and perinatal complications. Because of this higher risk, and partially in response to public concern stemming from these recalls, the American College of Obstetricians and Gynecologists issued guidelines for management of pregnant women with possible *L. monocytogenes* exposure (*4*). Although exposure to this recalled product was likely widespread, disease was very rare. Therefore, this recall and associated illness does not provide sufficient evidence to recommend that persons at higher risk for listeriosis (e.g., pregnant women, persons aged ≥65 years, and immunocompromised persons) avoid fresh stone fruits. However, it does support the need to understand risks associated with contaminated, ready-to-eat fresh fruit so that prevention strategies can be strengthened.

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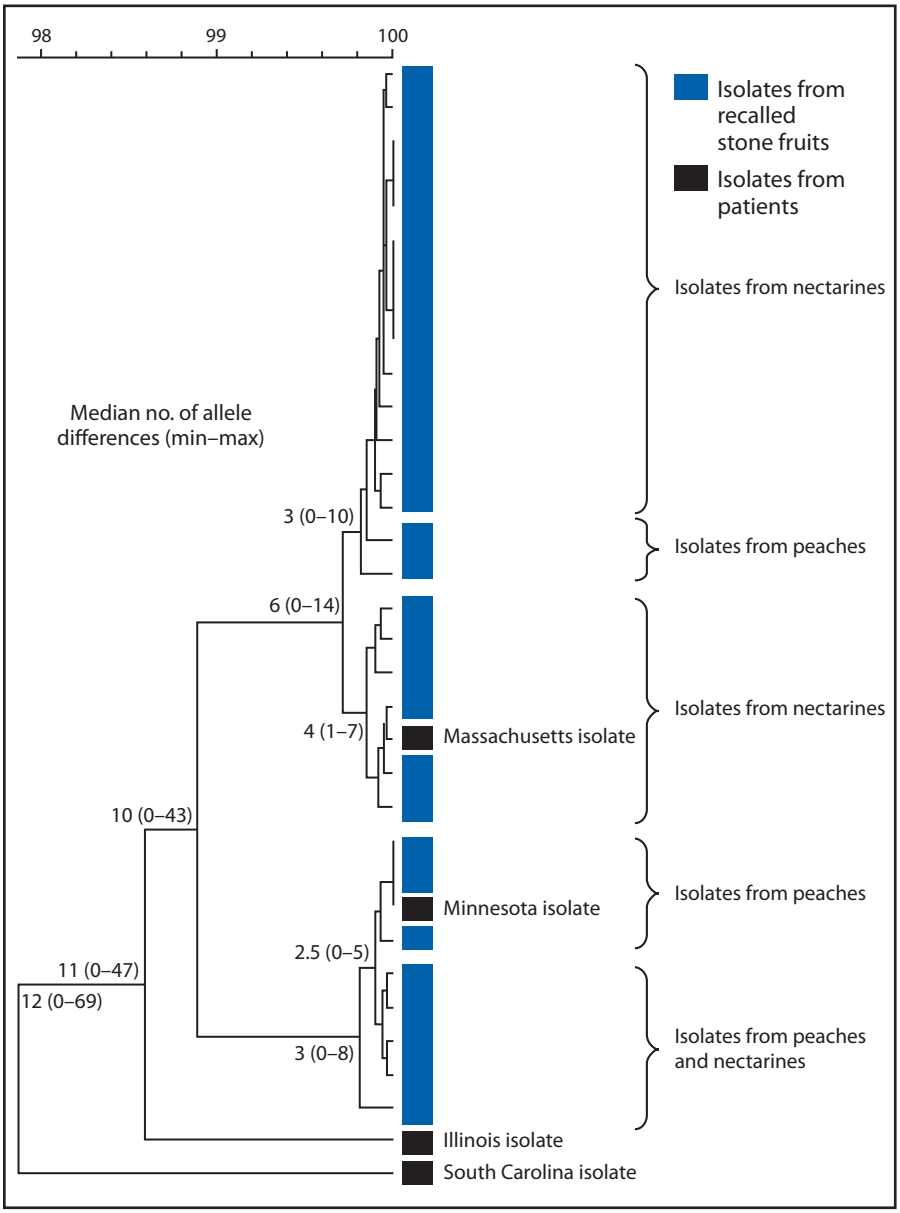
FIGURE. Phylogenetic tree by whole-genome multilocus sequence typing (wgMLST) of *Listeria monocytogenes* isolates from patients in four states and from recalled nectarines and peaches with indistinguishable pulsed–field gel electrophoresis patterns — United States, 2014*



* By wgMLST, the Massachusetts patient isolate differed from six closely related nectarine isolates by ≤7 alleles, and the Minnesota patient isolate differed from three closely related peach isolates by ≤5 alleles out of >5,800 loci analyzed in BioNumerics 7.5 wgMLST analysis pipeline. The Illinois and South Carolina patient isolates differed from the most closely related stone fruit isolate by 47 and 69 alleles, respectively.

Announcement

World Water Day — March 22, 2015

World Water Day, sponsored by the United Nations, is observed every year on March 22. This year, World Water Day focuses on water and sustainable development. Water is a finite resource that is fundamental to human health and well-being. However, an estimated 700 million persons lack access to improved sources of drinking water and 2.5 billion persons are without improved sanitation facilities,* putting them at risk for illness or death (*1*).

Water also plays a vital role in strengthening the resilience of social, economic, and environmental systems in the face of rapid and unpredictable changes. From food and energy security to human and environmental health, water is an essential part of sustainable development. As cities around the world, particularly in developing countries, continue to grow at an exponential rate, global water use is projected to increase by 55% through 2050, because of growing demands from manufacturing, thermal electricity generation and domestic use (*2*). Managing water resources efficiently and responsibly in the face of this growth and committing to developing a deeper understanding of the interconnections between water, food, energy, health, trade, and the environment are vital to ensuring sustainable development.

Additional information about World Water Day and ideas on how to get involved are available at http://www.unwater.org/worldwaterday. Information regarding CDC's efforts to ensure global access to improved water, sanitation, and hygiene resources is available at http://www.cdc.gov/healthywater/global.

*An improved water source is defined as water that is supplied through a household connection, public standpipe, borehole well, protected dug well, protected spring, or rainwater collection. Improved sanitation facilities usually ensure separation of human waste from human contact.

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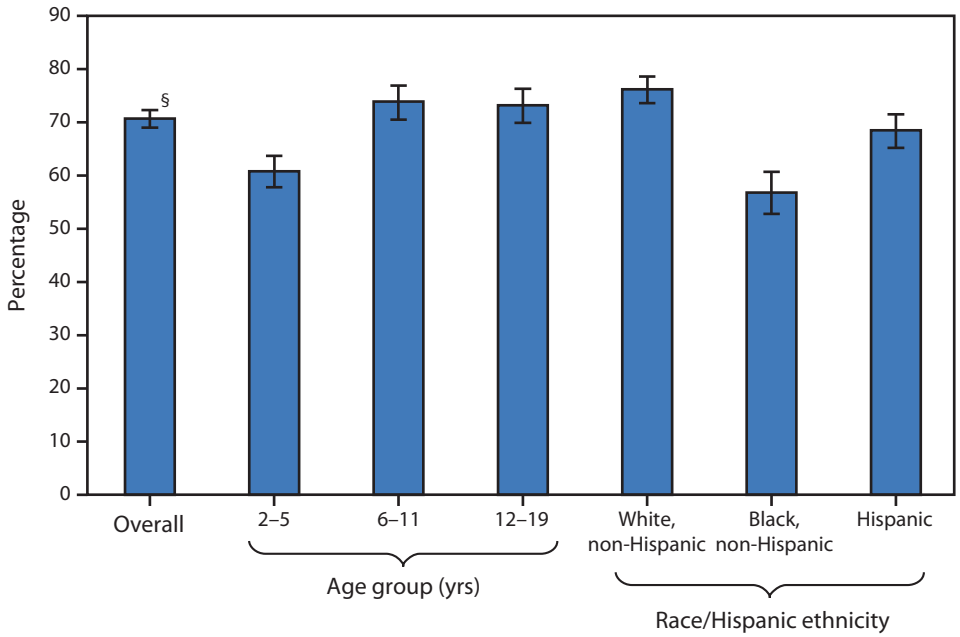
QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Percentage of Persons Aged 2–19 Years Who Consumed Caffeine from Food or Beverages,*† by Age Group and Race/Hispanic Ethnicity — National Health and Nutrition Examination Survey, United States, 2009–2012



* The National Health and Nutrition Examination Survey collects dietary intake information using 24-hour dietary recall interviews. Day 1 24-hour recall data were used in this analysis.
† Caffeine intake from foods (e.g., cookies, brownies, cakes, and candies that contain chocolate) and beverages (e.g., soda, tea, coffee, chocolate milk, and energy drinks) was calculated using the U.S. Department of Agriculture's Food and Nutrient Database for Dietary Studies (Version 5).
§ 95% confidence interval.

During 2009–2012, 70.7% of persons aged 2–19 years consumed caffeine on a given day. Caffeine consumption on a given day was less common among persons aged 2–5 years (60.8%) compared with those aged 6–11 years (73.9%) and those aged 12–19 years (73.2%). The percentage of non-Hispanic black persons aged 2–19 years who consumed caffeine on a given day (56.8%) was less than that of their non-Hispanic white and Hispanic counterparts (76.2% and 68.5%, respectively). The percentage of Hispanic persons aged 2–19 years who consumed caffeine on a given day was less than that of their non-Hispanic white counterparts.

Sources: Ahluwalia N, Herrick K, Moshfegh A, Rybak M. Caffeine intake in children in the United States and 10-y trends: 2001–2010. Am J Clin Nutr 2014;100:1124–32.

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