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Likely Female-to-Female Sexual Transmission of HIV — Texas, 2012

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In August 2012, the Houston Department of Health contacted CDC regarding the rare transmission of human immunodeficiency virus (HIV) likely by sexual contact between two women. The case was investigated, and laboratory testing confirmed that the woman with newly diagnosed HIV infection had a virus virtually identical to that of her female partner, who was diagnosed previously with HIV and who had stopped receiving antiretroviral treatment in 2010. This report describes this case of HIV infection, likely acquired by female-to-female sexual transmission during the 6-month monogamous relationship of the HIV-discordant couple (one negative, one positive). The woman with newly acquired infection did not report any other recognized risk factors for HIV infection, and the viruses infecting the two women had ≥98% sequence identity in three genes. The couple had not received any preventive counseling before acquisition of the virus by the woman who had tested negative for HIV. HIV-discordant couples should receive counseling regarding safer sex practices, and HIV-infected partners should be linked to and retained in medical care.

Transmission of HIV between women who have sex with women (WSW) has been reported rarely and is difficult to ascertain. The potential for HIV transmission by female-to-female sexual contact includes unprotected exposure to vaginal or other body fluids and to blood from menstruation, or to exposure to blood from trauma during rough sex. Other potential exposures associated with HIV transmission in WSW that must be ruled out include injection drug use (IDU), heterosexual sex, tattooing, acupuncture, piercing, use of shared sex toys between the partners and other persons, exposure to body fluids of others, and receipt of transplants or transfusion.

Epidemiologic Findings

The woman who acquired HIV was aged 46 years and had a history of heterosexual intercourse, but not in the 10 years before HIV infection. She reported three female sexual partners in the preceding 5 years but said she had no IDU, receipt of tattoos, acupuncture, transfusions, transplants, or any other recognized HIV risk behavior. The woman supplemented her income by selling her plasma and had tested negative for HIV by HIV-1/2 enzyme immunoassay (EIA) serology screening after donating plasma in March 2012.

In April, 10 days after donating plasma, the woman went to an emergency department with a sore throat, fever, vomiting, decreased appetite, pain on swallowing, dry cough, frequent diarrhea, and muscle cramps. At that time, she was again tested for HIV by EIA serology screening, and the results were

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negative. She was treated with azithromycin for a presumed upper respiratory infection and discharged. Eighteen days later, the woman attempted to sell plasma but was refused because she tested positive for HIV by EIA serology screening followed by an HIV-1 Western blot test. On July 5, results of repeated EIA and Western blot tests conducted on the woman at a health clinic were positive for HIV infection.

The likely source of the patient's new HIV infection was her female sex partner aged 43 years who had tested positive for HIV in September 2008 when she had an HIV-1 viral load of 82,000 copies/mL and a CD4+ T-lymphocyte count of 372 cells/mm^3 (25%). The partner began antiretroviral treatment in February 2009 but stopped in November 2010. Although she had esophageal candidiasis and weight loss at the time of her HIV diagnosis, her HIV-1 viral load had decreased to 178 copies/mL, and her CD4+ T-lymphocyte count had increased to 554 cells/mm^3 (44%) by January 2011, when she was lost to follow-up.

The couple reported routinely having unprotected (using no barrier precautions) oral and vaginal contact and using insertive sex toys that were shared between them but were not shared with any other persons. They described their sexual contact as at times rough to the point of inducing bleeding in either woman. They also reported having unprotected sexual contact during the menses of either partner. The recently infected woman reported that her partner was her only sexual contact during the 6 months before her seroconversion.

Phylogenetic Analyses

On September 10, 2012, the newly infected woman tested positive for HIV by HIV-1/2/O EIA, and her HIV-1 Western blot was positive for all bands. Her Multispot test was reactive to HIV-1 only, and she had an HIV-1 viral load of 23,600 copies/mL. The partner's blood tested positive by HIV-1/2/O EIA, and her HIV-1 Western blot was positive for all bands. Her Multispot test was reactive to HIV-1 only, and she had a HIV-1 viral load of 69,000 copies/mL. HIV-1 polymerase (*pol*), group antigen (*gag*), and envelope (*env*) sequences were amplified by polymerase chain reaction from specimens from both women. Phylogenetic analyses of the *pol* and *env* sequences revealed that both women had highly related sequences with pairwise nucleotide identity of 98.7% in *gag* and 98.0% in both *env* and *pol*. Neither *pol* sequence had any major drug resistance mutations but shared the following polymorphisms: protease (M36I, R41K, and L63T) and reverse transcriptase (R83K, K122E, I178L, and R211K).

Editorial Note

This report describes a case of HIV transmission likely by sexual contact between female partners. Past confirmation of HIV transmission during female-to-female sexual contact has been difficult because other risk factors almost always are present or cannot be ruled out. In this case, other risk factors for HIV transmission were not reported by the newly infected woman, and the viruses infecting the two women were virtually identical.

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Few previous reports describe HIV transmission between WSW. One case involved a woman diagnosed in the Philippines who reported sexual contact exclusively with women and said she did not use injection drugs; however, no source of transmission was confirmed (*1*). Another instance of HIV transmission between WSW was reported for a woman aged 20 years with no other risk behaviors who said she had a 2-year relationship and unprotected intercourse with a female partner known to be HIV-infected (*2*). The woman and her partner had identical HIV-1 drug resistance mutations, but no phylogenetic linkage testing was conducted.

More commonly, HIV infections in WSW have been attributed to risk behaviors such as IDU or to concomitant heterosexual sex. A study of 18 HIV-discordant WSW couples followed for 3–6 months found no evidence of transmission, leading the authors to suggest that no risk for HIV transmission might exist in exclusive WSW couples (*3*). The same authors described the cases of 11 HIV-positive WSW and found that 10 used injection drugs and two provided a history of sexual activity with both men and women (*4*). In a cohort of 511 women with a history of female-to-female sexual contact, 470 (92%) reported having sex with both men and women, and 41 (8%) were WSW only; 13 women were found to have HIV infection, but none were categorized as WSW only (*5*).

To document female-to-female sexual contact in women who were HIV-positive, a survey of 960,000 female blood donors was conducted; of 144 women who tested positive for HIV infection, 106 were interviewed. Of these 106 women, 102 were heterosexual, three had a history of sex with both men and women, one reported having had sex with a person with a history of IDU whose sex was not given, and three women had a history of IDU. None of the 106 women reported female-to-female sexual contact as their only risk behavior (*6*). In another large survey conducted during 1986–1989, a total of 1,014 female patients in a clinic were interviewed, and 101 (10%) reported female-to-female sexual contact. Of the 101 WSW, 90% provided a history of sex with both men and women, and 37% reported IDU history. All 13 women who tested HIV-positive and reported female-to-female sexual contact also provided a history of sexual contact with men, and 12 reported IDU history (*7*).

A series of reports by CDC authors did not confirm HIV transmission by female-to-female sexual contact alone. In a 1990 report, among 79 women who were HIV-positive and had female-to-female sexual contact history only, 75 also had a history of IDU, and the remaining four had received transfusions (*8*). In a 1992 report, a total of 18,199 women with acquired immunodeficiency syndrome (AIDS) from the period 1980–1991 were examined; 164 of these women provided a history of female-to-female sexual contact. Of the 164, a total of 152 (93%) provided an additional history of IDU, and 12 (7%) had received blood before 1985 (*9*). In a 1994 report, of 1,122 women found to be HIV-positive, 65 (5.8%) had a history of female-to-female sexual contact. Of the 65, a total of 55 (85%) also had a history of sexual contact with men; 28 of the women with a history of sexual contact with both men and women also reported IDU. Of the 10 remaining women with exclusive female-to-female sexual contact, eight reported IDU, one had received a blood transfusion, and one was reported as having no other identified risk behavior (*10*).

This report describes likely female-to-female transmission of HIV-1 supported by phylogenetic analysis in a WSW couple who had unprotected sex during a 6-month monogamous relationship. Although rare, HIV transmission between WSW can occur. All persons at risk for HIV, including all discordant couples, should receive information regarding the prevention of HIV and sexually transmitted infections to prevent the HIV-negative partner from acquiring the infection. Furthermore, all persons identified as infected with HIV should be linked to and retained in medical care. Control of HIV infection with suppression of viral load can result in better health outcomes and a reduced chance of transmitting HIV to partners.

What is already known on this topic?

Cases of human immunodeficiency virus (HIV) infection transmitted by sexual contact between women who have sex with women are rare and difficult to ascertain. Other, more common, modes of transmission, such as injection drug use and heterosexual sex, usually are difficult to rule out. However, female-to-female transmission is possible because HIV can be found in vaginal fluid and menstrual blood.

What is added by this report?

In 2012, a woman who reported no heterosexual sex in the previous 10 years, injection drug use, or other recognized risk factors for HIV infection tested HIV-positive during a 6-month monogamous relationship with a female sexual partner who was HIV-positive and had stopped receiving antiretroviral treatment in 2010. Phylogenetic analysis of the HIV virus from the two women showed that the viruses were virtually identical.

What are the implications for public health practice?

Discordant couples of any sex should know their HIV status and receive education and counseling services, especially instruction in safer sex practices. Persons identified as HIV-infected should be linked to and retained in medical care. A suppressed HIV viral load can result in better health outcomes and reduce the possibility of transmitting HIV infection to partners

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Alcohol-Attributable Deaths and Years of Potential Life Lost — 11 States, 2006–2010

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Excessive alcohol consumption, the fourth leading preventable cause of death in the United States (*1*), resulted in approximately 88,000 deaths and 2.5 million years of potential life lost (YPLL) annually during 2006–2010 and cost an estimated $223.5 billion in 2006 (*2*). To estimate state-specific average annual rates of alcohol-attributable deaths (AAD) and YPLL caused by excessive alcohol use, 11 states analyzed 2006–2010 data (the most recent data available) using the CDC Alcohol-Related Disease Impact (ARDI) application. The age-adjusted median AAD rate was 28.5 per 100,000 population (range = 50.9 per 100,000 in New Mexico to 22.4 per 100,000 in Utah). The median YPLL rate was 823 per 100,000 (range = 1,534 YPLL per 100,000 for New Mexico to 634 per 100,000 in Utah). The majority of AAD (median = 70%) and YPLL (median = 82%) were among working-age (20–64 years) adults. Routine monitoring of alcohol-attributable health outcomes, including deaths and YPLL, in states could support the planning and implementation of evidence-based prevention strategies recommended by the Community Preventive Services Task Force to reduce excessive drinking and related harms. Such strategies include increasing the price of alcohol, limiting alcohol outlet density, and holding alcohol retailers liable for harms related to the sale of alcoholic beverages to minors and intoxicated patrons (dram shop liability) (*3*).

The ARDI Custom Data module* was used for this analysis by 11 states (California, Florida, Michigan, Nebraska, New Mexico, North Carolina, North Dakota, South Dakota, Utah, Virginia, and Wisconsin) participating in the Council of State and Territorial Epidemiologists' Alcohol Subcommittee. ARDI estimates AAD and YPLL resulting from excessive alcohol use by using multiple data sources and methods (*4*).† ARDI estimates AAD by multiplying the number of age- and sex-specific deaths from 54 alcohol-related conditions by the alcohol-attributable fractions (AAF) for that condition. AAF are used to express the extent to which alcohol consumption contributes to a health outcome. AAF estimate the proportion of deaths from various causes that are directly or indirectly attributable to alcohol consumption. The AAF range from 1.0 for 15 conditions (e.g., alcoholic liver disease and alcoholic polyneuropathy) to as low as 0.01 (e.g., hypertension and hemorrhagic stroke in females). The AAF used in ARDI and for this analysis are provided in the application. YPLL by age, sex, and race/ethnicity were calculated by multiplying age- and sex-specific AAD estimates for each cause by the corresponding life expectancy estimate at the time of death.§ For chronic causes of death (e.g., liver disease), AAD and YPLL were estimated for decedents aged ≥20 years; for acute causes, they were estimated for decedents aged ≥15 years. AAD and YPLL also were estimated for persons aged <15 years who died from motor-vehicle crashes, child maltreatment, or low birth weight. State death certificate data from 2006–2010, the most recent available for participating states, were used to determine the average annual number of alcohol-related deaths for the 54 alcohol-related conditions assessed by the ARDI application and to obtain decedent demographic information. Death records missing data on decedent age, sex, or race/ethnicity were excluded. Prevalence data on alcohol use for 2006–2010 were obtained from state Behavioral Risk Factor Surveillance Systems and used to calculate AAF for most chronic conditions profiled in ARDI. Average annual state rates for AAD and YPLL per 100,000 population for 2006–2010 were calculated by dividing the average annual AAD and YPLL estimates for 2006–2010 by the average annual bridged-race population estimates from the U.S. Census for 2006–2010, and then multiplying by 100,000. The rates were then age-adjusted to the 2000 U.S. population.

During 2006–2010, the median age-adjusted AAD rate was 28.5 per 100,000 (state median AAD = 1,647; rate range = 50.9 deaths per 100,000 in New Mexico to 22.4 per 100,000 in Utah) (Table 1). The median AAD rates increased with age, and the majority of AAD (median 70%) involved working-age (20–64 years) adults. The median AAD rate was highest (60.3 per 100,000) for persons aged ≥65 years and lowest (4.1 per 100,000) for persons aged 0–19 years. The median age-adjusted AAD rate for men (42.4 per 100,000) was

* Available at http://apps.nccd.cdc.gov/ardi.

† Additional information available at http://apps.nccd.cdc.gov/dach_ardi/info/methods.aspx.

§ Available at http://www.cdc.gov/nchs/products/life_tables.htm#life for 2006–2009, and at http://www.cdc.gov/nchs/data/nvsr/nvsr61/nvsr61_04.pdf for 2010.

TABLE 1. Average annual alcohol-attributable deaths (AAD)* and rates, by selected characteristics — 11 U.S. states, 2006–2010

Characteristic	California		Florida		Michigan		Nebraska		New Mexico	
	AAD	Rate	AAD	Rate	AAD	Rate	AAD	Rate	AAD	Rate
Age group (yrs)†										
0–19	390	3.7	185	4.1	121	4.4	21	4.2	34	6.0
20–34	1,583	20.1	1,014	29.3	430	23.1	66	17.9	166	41.6
35–49	2,546	31.8	1,451	37.3	709	33.4	95	26.5	289	72.2
50–64	3,398	56.3	1,879	53.6	916	47.4	113	34.5	299	78.0
≥65	2,578	64.8	1,718	54.8	926	70.2	141	58.6	245	94.5
Sex§										
Male	7,589	43.9	4,460	46.3	2,095	42.4	295	33.4	723	73.4
Female	2,906	15.8	1,788	16.6	1,006	18.1	140	14.6	310	29.4
Race/Ethnicity§¶										
AI/AN	129	25.4	17	20.2	29	40.7	12	65.4	182	99.2
A/NH/PI	589	11.9	40	8.3	21	11.0	—**	—**	—**	—**
Black	913	36.6	725	25.4	594	42.9	24	29.7	16	31.8
White, Hispanic	3,013	33.4	792	22.0	44	16.3	20	19.9	409	53.3
White, non-Hispanic	5,775	31.2	4,613	35.2	2,342	27.4	372	22.7	411	40.2
Total§	**10,495**	**29.4**	**6,248**	**31.0**	**3,102**	**29.9**	**436**	**23.7**	**1,033**	**50.9**

See table footnotes below.

TABLE 1. (*Continued*) Average annual alcohol-attributable deaths (AAD)* and rates, by selected characteristics — 11 U.S. states, 2006–2010

Characteristic	North Carolina		North Dakota		South Dakota		Utah		Virginia		Wisconsin	
	AAD	Rate	AAD	Rate	AAD	Rate	AAD	Rate	AAD	Rate	AAD	Rate
Age group (yrs)†												
0–19	106	4.2	—**	—**	12	5.4	23	2.5	73	3.5	54	3.6
20–34	502	27.0	27	18.9	40	25.0	103	15.7	320	19.7	214	19.6
35–49	669	33.1	45	36.2	60	39.1	124	26.3	448	25.6	352	29.2
50–64	753	44.0	42	33.4	66	44.2	146	39.6	512	34.8	451	41.9
≥65	676	57.8	58	60.3	81	70.8	117	49.7	480	51.6	577	76.4
Sex§												
Male	1,930	42.7	123	36.6	175	43.9	354	31.0	1,297	33.7	1,092	38.5
Female	777	15.4	56	15.8	83	19.4	158	13.9	535	12.7	555	17.7
Race/Ethnicity§¶												
AI/AN	47	35.2	36	122.8	74	133.2	19	60.6	—**	—**	32	61.4
A/NH/PI	15	8.8	—**	—**	—**	—**	—**	—**	32	8.6	14	15.1
Black	578	29.3	—**	—**	—**	—**	—**	—**	388	25.4	121	39.0
White, Hispanic	109	20.5	—**	—**	—**	—**	50	25.4	68	16.4	46	26.4
White, non-Hispanic	1,953	28.6	139	21.4	178	23.4	430	21.9	1,338	23.5	1,433	27.0
Total§	**2,707**	**28.5**	**179**	**26.2**	**259**	**31.5**	**513**	**22.4**	**1,832**	**22.8**	**1,647**	**27.9**

Abbreviations: AAD = alcohol-attributable deaths; AI/AN = American Indian/Alaska Native; A/NH/PI = Asian, Native Hawaiian, or Pacific Islander.

* The CDC Alcohol-Related Disease Impact application estimates AAD resulting from excessive alcohol use by using multiple data sources and methods. Additional information on the methods is available at http://apps.nccd.cdc.gov/dach_ardi/info/methods.aspx.

† Rates are age-specific per 100,000 population.

§ Rates are per 100,000 population, age-adjusted to the U.S. 2000 standard population.

¶ Non-white Hispanics are included in the other racial groups.

** Race/ethnicity estimates <10 are suppressed.

more than twice the median age-adjusted AAD rate for women (15.8 per 100,000). AAD rates varied substantially by race and ethnicity; some states (e.g., North Dakota and South Dakota) had very high rates of AAD among American Indians/Alaska Natives (AI/AN), whereas rates in other states (California, Michigan, and Virginia) were highest among blacks (Table 1).

During 2006–2010, the median age-adjusted YPLL rate was 823 per 100,000 population (state median YPLL = 42,756; rate range = 1,534 YPLL per 100,000 in New Mexico to 634 YPLL per 100,000 in Utah) (Table 2). The median YPLL rates were highest among persons aged 35–49 years (state median YPLL = 12,486; median state rate = 1,183 per 100,000) and lowest among persons aged 0–19 years (state median YPLL = 3,285; median state rate = 256 per 100,000). A median of 82% of all alcohol-attributable YPLL involved working-age adults (range = 85% in New Mexico to 78% in Nebraska). The median YPLL rate for men (1,215 per 100,000) was more than twice the median rate for women (456 per 100,000). YPLL rates were highest for AI/AN, ranging from 4,195 YPLL (South Dakota) to 200 YPLL per 100,000 (Virginia) (Table 2).

TABLE 2. Average annual alcohol-attributable years of potential life lost (YPLL)* and rates, by selected characteristics — 11 U.S. states, 2006–2010

	California		Florida		Michigan		Nebraska		New Mexico	
Characteristic	**YPLL**	**Rate**	**YPLL**	**Rate**	**YPLL**	**Rate**	**YPLL**	**Rate**	**YPLL**	**Rate**
Age group (yrs)†										
0–19	23,736	227	11,124	247	7,565	278	1,300	256	2,106	368
20–34	79,511	1,009	51,066	1,475	21,537	1,159	3,316	905	8,281	2,073
35–49	89,917	1,123	51,528	1,324	25,161	1,185	3,399	949	10,285	2,573
50–64	80,709	1,338	44,611	1,271	21,874	1,132	2,665	817	7,148	1,867
≥65	27,187	684	17,495	558	9,250	702	1,368	568	2,538	981
Sex§										
Male	221,055	1,215	126,524	1,388	59,769	1,220	8,373	940	21,508	2,201
Female	80,005	434	49,299	510	25,618	493	3,676	410	8,851	878
Race/Ethnicity§¶										
AI/AN	4,013	691	569	599	905	1,159	428	2,060	6,350	3,194
A/NH/PI	16,312	309	1,254	237	658	271	97	267	160	438
Black	31,451	1,187	26,269	849	20,566	1,411	973	1,062	548	1,037
White, Hispanic	99,827	915	25,407	668	1,562	475	802	625	12,714	1,564
White, non-Hispanic	146,958	858	120,193	1,072	59,380	742	9,561	627	10,299	1,157
Total§	**301,060**	**823**	**175,824**	**944**	**85,387**	**853**	**12,049**	**675**	**30,358**	**1,534**

See table footnotes below.

TABLE 2. (*Continued*) Average annual alcohol-attributable years of potential life lost (YPLL)* and rates, by selected characteristics — 11 U.S. states, 2006–2010

	North Carolina		North Dakota		South Dakota		Utah		Virginia		Wisconsin	
Characteristic	**YPLL**	**Rate**	**YPLL**	**Rate**	**YPLL**	**Rate**	**YPLL**	**Rate**	**YPLL**	**Rate**	**YPLL**	**Rate**
Age group (yrs)†												
0–19	6,520	260	436	256	747	333	1,427	154	4,479	217	3,285	218
20–34	25,271	1,357	1,365	950	1,990	1,258	5,149	784	16,199	999	10,782	986
35–49	23,903	1,183	1,627	1,298	2,139	1,383	4,468	944	15,945	911	12,486	1,035
50–64	17,872	1,044	984	790	1,579	1,061	3,497	951	12,137	824	10,732	999
≥65	7,143	611	570	595	790	695	1,220	518	4,943	531	5,470	724
Sex§												
Male	58,658	1,285	3,520	1,057	5,038	1,277	11,027	875	38,794	986	29,662	1,048
Female	22,050	457	1,462	456	2,207	561	4,733	392	14,908	363	13,094	447
Race/Ethnicity§¶												
AI/AN	1,722	1,170	1,288	3,893	2,637	4,195	673	1,794	85	200	1,069	1,819
A/NH/PI	545	251	—**	—**	28	320	225	269	935	211	473	398
Black	19,370	939	56	940	80	700	188	694	13,041	809	4,385	1,227
White, Hispanic	4,779	705	35	463	127	858	1,894	728	2,706	516	1,698	713
White, non-Hispanic	54,074	850	3,543	586	4,354	622	12,752	617	36,786	680	35,097	708
Total§	**80,708**	**863**	**4,982**	**763**	**7,245**	**923**	**15,760**	**634**	**53,703**	**670**	**42,756**	**748**

Abbreviations: YPLL = years of potential life lost; AI/AN = American Indian/Alaska Native; A/NH/PI = Asian, Native Hawaiian, or Pacific Islander.

* The CDC Alcohol-Related Disease Impact application estimates YPLL resulting from excessive alcohol use by using multiple data sources and methods. Additional information on the methods is available at http://apps.nccd.cdc.gov/dach_ardi/info/methods.aspx.

† Rates are age-specific per 100,000 population.

§ Rates are per 100,000 population, age-adjusted to the U.S. 2000 standard population.

¶ Non-white Hispanics are included in the other racial groups.

** Race/ethnicity estimates <10 are suppressed.

Editorial Note

During 2006–2010, excessive alcohol use resulted in a median annual age-adjusted AAD rate of 28.5 per 100,000 population and a median YPLL rate of 823 per 100,000 in the 11 states studied. Approximately two out of three deaths and four out of five YPLL were among working-aged adults, and more than two thirds of AAD and YPLL involved males. Although the majority of AAD involved non-Hispanic whites, the median AAD rate for AI/AN (60.6 per 100,000) was twice as high as the AAD rate for any other racial or ethnic group. These findings are consistent with other published estimates on the distribution of AAD and YPLL by sex (*4*), disparities by race/ethnicity within states (*5*), and differences in AI/AN rates among states (*6*).

What is already known on this topic?

The health consequences of excessive alcohol use vary across geographically diverse states and include substantial disparities in alcohol-related outcomes by sex and race/ethnicity.

What is added by this report?

Adjusted to the 2000 U.S. standard population, in a convenience sample of 11 states, the median alcohol-attributable death (AAD) rate was 28.5 per 100,000, and the median years of potential life lost (YPLL) was 823 per 100,000 during 2006–2010. The majority of AAD (median 70%) and YPLL (median = 82%) were among working-age adults (aged 20–64 years).

What are the implications for public health practice?

Routine monitoring of alcohol-attributable health outcomes, including deaths and YPLL, in states could support the planning and implementation of evidence-based prevention strategies recommended by the Community Preventive Services Task Force to reduce excessive drinking and related harms. Such strategies include increasing the price of alcohol, limiting alcohol outlet density, and holding alcohol retailers liable for harms related to the sale of alcoholic beverages to minors and intoxicated patrons (dram shop liability).

The findings in this report highlight the ongoing public health impact of excessive drinking in the United States, as well as the geographic and demographic disparities in AAD and YPLL. Differences in age-adjusted rates of AAD and YPLL among states probably reflect differences in the prevalence of excessive drinking (*7*), which is affected by various factors, including state and local laws governing the price, availability, and marketing of alcoholic beverages (*8*). These death rates also might reflect the influence of other factors (e.g., rurality and access to trauma care) that could affect the risk for death from alcohol-attributable conditions (*9*). The high rates of AAD and YPLL among working-age adults further highlight the impact of excessive alcohol use throughout a person's lifespan, and were a major contributor to alcohol-attributable productivity losses from premature mortality that, together with lost wages, were responsible for 72% of the estimated $223.5 billion in economic costs in 2006 (*2*). The AAD and YPLL rates were lower among the 0–19 years age group because this age group had fewer AAD compared with other age groups.

The findings in this report are subject to at least seven limitations. First, ARDI exclusively uses the underlying cause of death and does not consider contributing causes that might be alcohol-related. Second, ARDI does not include AAD estimates for several causes (e.g., tuberculosis) for which excessive alcohol use is believed to be an important risk factor. Third, the alcohol data used to calculate AAF estimates were based on self-reports and might underestimate the actual prevalence of excessive alcohol use (*10*). Fourth, state estimates calculated in this study might be different than those available in the ARDI application. Fifth, national AAF data were used, even though studies suggest that there are important state differences in AAF for some causes of alcohol-attributable deaths. Sixth, AAD and YPLL rates could not be calculated for some age and race/ethnicity categories because of the small number of AAD in some of these groups. Finally, some AI/AN might have been misclassified by race on death certificates, which could have resulted in an underestimate of the number of AI/AN deaths and YPLL in states (*6*).

The Community Preventive Services Task Force has recommended several population-level, evidence-based strategies to reduce excessive drinking and related harms, including increasing the price of alcohol, limiting alcohol outlet density, and holding alcohol retailers liable for harms related to the sale of alcoholic beverages to minors and intoxicated patrons (dram shop liability) (*3*). Routine monitoring of alcohol-attributable health outcomes, including deaths and YPLL, in states could support the planning and implementation of evidence-based prevention strategies to reduce excessive drinking and related harms.

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Prevalence of Influenza-Like Illness and Seasonal and Pandemic H1N1 Influenza Vaccination Coverage Among Workers — United States, 2009–10 Influenza Season

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During an influenza pandemic, information about the industry and occupation (I&O) of persons likely to be infected with influenza virus is important to guide key policy decisions regarding vaccine prioritization and exposure-control measures. Health-care personnel (HCP) might have increased opportunity for exposure to influenza infection, and they have been prioritized for influenza vaccination because of their own risk and the risk that infected HCP pose to patients (*1*). To identify other groups of workers that might be at increased risk for pandemic influenza infection, influenza-like illness (ILI) and vaccination coverage data from the 2009 National H1N1 Flu Survey (NHFS), which was conducted during October 2009 through June 2010, were analyzed. In a representative sample of 28,710 employed adults, 5.5% reported ILI symptoms in the month before the interview, and 23.7% received the 2009 pandemic H1N1 (pH1N1) influenza vaccine. Among employed adults, the highest prevalence of ILI was reported by those employed in the industry groups "Real estate and rental and leasing" (10.5%) and "Accommodation and food services" (10.2%), and in the occupation groups "Food preparation and serving related" (11.0%) and "Community and social services" (8.3%). Both seasonal influenza and pH1N1 vaccination coverage were relatively low in all of these groups of workers. Adults not in the labor force (i.e., homemakers, students, retired persons, and persons unable to work) had ILI prevalence and pH1N1 vaccination coverage similar to those found in all employed adults combined; in contrast, ILI prevalence was higher and pH1N1 vaccination coverage was lower among unemployed adults (i.e., those looking for work). These results suggest that adults employed in certain industries and occupations might have increased risk for influenza infection, and that the majority of these workers did not receive seasonal or pH1N1 influenza vaccine. Unemployed adults might also be considered a high risk group for influenza.

The NHFS was designed to produce population-based estimates of the prevalence of ILI and seasonal and pH1N1 influenza vaccination coverage during the 2009–10 influenza season, when the novel influenza A (H1N1) strain (influenza A [H1N1]pdm09 or pH1N1) was circulating at pandemic levels. As described elsewhere (*2*), the NHFS was a random-digit–dialed telephone survey that sampled landline telephone and cellular telephone households from all 50 states and the District of Columbia. In addition to questions related to influenza vaccination status and recent respiratory illness and health risks, the adult questionnaire included questions about employment status and I&O of employment. Monthly targets were set to achieve approximately 6,000 interviews per month. Interviews were conducted during October 2009 through June 2010. The Council of American Survey Research Organizations (CASRO) response rate* for the NHFS was 34.0% for landline telephone respondents and 25.5% for cellular telephone respondents.

ILI was defined as having been sick with fever and cough or sore throat in the past month. Adjusted prevalence and adjusted prevalence ratios (APRs) based on predicted marginals from logistic regression models are reported. Groups with relatively low prevalence of ILI and relatively high sample sizes were used as reference categories for APRs. Those who reported receiving the seasonal influenza vaccine during the period from August 2009 to the month of interview were defined as vaccinated against seasonal influenza, whereas those who reported receiving the 2009 pH1N1 vaccine during the period from October 2009 to the month of interview were considered vaccinated against 2009 pH1N1. Vaccination coverage estimates were calculated using the Kaplan-Meier survival analysis procedure to determine the cumulative proportion of persons vaccinated with at least 1 dose of each vaccine. For respondents who indicated they had been vaccinated but had a missing date of vaccination (5.8% for 2009 pH1N1 and 3.8% for seasonal influenza), the month and year of vaccination was imputed using the weighted sequential hot deck method. Results were weighted and analyzed with statistical software to account for the complex survey design. Influenza vaccination coverage estimates based on this survey for all adults and children have been published previously, in combination with data from the Behavioral Risk Factor Surveillance System (*2*).

Among employed adults, the highest prevalence of ILI was reported by those employed in the industry groups "Real estate and rental and leasing" (10.5% [95% confidence interval (CI) = 5.1%–20.5%]) and "Accommodation and food services" (10.2% [CI = 7.4%–13.9%]) (Table 1). In addition

* Information regarding the calculation of CASRO response rates available at http://c.ymcdn.com/sites/www.casro.org/resource/resmgr/docs/casro_on_definitions_of_resp.pdf.

TABLE 1. Influenza-like illness (ILI) and seasonal and 2009 pandemic influenza A (H1N1) (pH1N1) vaccination coverage, by industry of employment — 2009 National H1N1 Flu Survey, United States

Industry category (2007 NAICS code)	Unweighted sample size	Weighted prevalence of ILI		Adjusted PR for ILI		Seasonal influenza vaccination coverage		pH1N1 influenza vaccination coverage	
		%	(95% CI)*	PR	(95% CI)†§	%	(95% CI)¶	%	(95% CI)**
Real estate and rental and leasing (NAICS 53)	449	10.5	(5.1–20.5)	3.31	(1.49–7.38)	35.9	(27.4–44.4)	16.8	(10.7–22.9)
Accommodation and food services (NAICS 72)	1,128	10.2	(7.4–13.9)	3.12	(1.91–5.11)	17.4	(12.6–22.2)	16.5	(12.1–20.9)
Educational services (NAICS 61)	3,800	6.3	(5.0–8.0)	1.91	(1.23–2.96)	43.6	(40.5–46.7)	26.8	(23.9–29.7)
Information (NAICS 51)	663	6.1	(3.2–11.1)	1.89	(0.92–3.88)	30.3	(24.2–36.4)	11.8	(7.8–15.8)
Manufacturing (NAICS 31–33)	1,844	5.6	(4.0–8.0)	1.77	(1.08–2.91)	37.6	(33.5–41.7)	18.6	(14.5–22.7)
Administrative and support and waste management and remediation services (NAICS 56)	704	5.5	(3.0–10.0)	1.65	(0.79–3.41)	22.5	(17.2–27.8)	13.2	(9.0–17.4)
Health care and social assistance (NAICS 62)	5,185	5.4	(4.4–6.7)	1.49	(0.96–2.30)	58.5	(55.8–61.2)	44.5	(41.1–47.9)
Retail trade (NAICS 44–45)	2,235	5.1	(3.9–6.7)	1.51	(0.96–2.39)	31.8	(28.2–35.4)	16.0	(12.8–19.2)
Public administration (NAICS 92)	1,870	5.1	(3.7–6.9)	1.39	(0.85–2.26)	48.0	(43.3–52.7)	29.3	(24.6–34.0)
Arts, entertainment, and recreation (NAICS 71)	585	5.1	(2.6–9.8)	1.55	(0.72–3.31)	32.8	(22.1–43.5)	16.9	(11.0–22.8)
Other services (except public administration) (NAICS 81)	1,163	5.0	(3.3–7.6)	1.63	(0.94–2.83)	24.8	(20.5–29.1)	14.4	(10.6–18.2)
Construction (NAICS 23)	1,822	4.9	(3.5–6.8)	1.49	(0.91–2.44)	21.6	(17.7–25.5)	11.8	(8.7–14.9)
Transportation and warehousing (NAICS 48–49)	1,081	4.5	(2.9–6.9)	1.41	(0.80–2.48)	25.6	(21.5–29.7)	13.7	(10.1–17.3)
Professional, scientific, and technical services (NAICS 54)	2,586	4.1	(3.2–5.3)	1.26	(0.81–1.98)	36.9	(33.5–40.3)	20.7	(17.5–23.9)
Utilities (NAICS 22)	270	4.0	(1.9–8.2)	1.31	(0.58–2.94)	36.6	(27.0–46.2)	16.0	(9.1–22.9)
Finance and insurance (NAICS 52)	1,330	3.8	(2.5–5.5)	Referent	—	39.7	(34.6–44.8)	15.2	(11.5–18.9)
Wholesale trade (NAICS 42)	440	3.8	(1.8–7.9)	1.17	(0.52–2.60)	34.0	(24.6–43.4)	21.4	(10.9–31.9)
Agriculture, forestry, fishing, and hunting (NAICS 11)	622	3.2	(1.6–6.3)	0.91	(0.42–2.00)	25.2	(18.1–32.3)	13.1	(8.0–18.2)
Mining, quarrying, and oil and gas extraction (NAICS 21)	177	2.3	(0.9–5.7)	0.79	(0.30–2.09)	25.2	(11.4–39.0)	23.7	(5.3–42.1)

Abbreviations: NAICS = North American Industry Classification System; PR = prevalence ratio; CI = confidence interval.

* Adjusted for interview month.

† Adjusted for interview month, vaccination status (seasonal and pH1N1 influenza), chronic medical conditions (asthma or another lung condition, diabetes, a heart condition, a kidney condition, sickle cell anemia or other anemia, a neurologic or neuromuscular condition, a liver condition, or a weakened immune system caused by a chronic illness or by medicines taken for a chronic illness), and age group.

§ Reference group is "finance and insurance" (NAICS 52).

¶ September 2009–June 2010.

** October 2009–June 2010.

to these two groups, both the "Educational services" and "Manufacturing" industries had significantly higher APRs for ILI compared with the reference industry group of "Finance and insurance." Among occupation groups, the highest prevalences of ILI were reported by "Food preparation and serving related" (11.0% [CI = 7.7%–15.5%]) and "Community and social services" (8.3% [CI = 4.2%–15.9%]) (Table 2). In addition to these two groups, "Personal care and service," "Building and grounds cleaning and maintenance," and four other groups had significantly higher APRs for ILI compared with the reference occupation group of "Business and financial operations." In the "Accommodation and food services" industry and the "Food preparation and serving related" occupation group, coverage with both seasonal influenza vaccine and pH1N1 vaccine were lower than vaccination coverage among all employed adults combined (Table 3).

The APR for ILI for the industry group "Healthcare and social assistance" was not significantly different from 1.0, and neither were the APRs for ILI for the occupations of "Healthcare support" or "Healthcare practitioners and technical." On the other hand, these industry and occupation groups reported the highest pH1N1 vaccination coverage (38.8%–58.7%) and, along with "Life, physical, and social science" occupations, the highest seasonal influenza vaccination coverage (47.2%–67.0%).

Among all adults, employed persons had a similar prevalence of ILI in the month before the interview (5.5%) compared with those not in the labor force (6.0%); these groups also had similar pH1N1 vaccination coverage (23.7% versus 26.5%) (Table 3). In contrast, ILI prevalence was higher (9.4%) and pH1N1 vaccination coverage was lower (16.7%) among unemployed adults in the labor force.

TABLE 2. Influenza-like illness (ILI) and seasonal and 2009 pandemic influenza A (H1N1) (pH1N1) vaccination coverage, by occupation — 2009 National H1N1 Flu Survey, United States

Occupational group (2010 SOC major group)	Unweighted sample size	Weighted prevalence of ILI		Adjusted PR for ILI		Seasonal influenza vaccination coverage		pH1N1 influenza vaccination coverage	
		%	(95% CI)*	PR	(95% CI)†§	%	(95% CI)¶	%	(95% CI)**
Food preparation and serving related occupations (SOC 35)	836	11.0	(7.7–15.5)	3.07	(1.85–5.08)	21.2	(15.6–26.8)	15.6	(11.4–19.8)
Community and social services occupations (SOC 21)	695	8.3	(4.2–15.9)	2.26	(1.06–4.83)	45.0	(37.3–52.7)	30.4	(23.2–37.6)
Personal care and service occupations (SOC 39)	721	7.5	(4.5–12.3)	2.06	(1.11–3.83)	33.8	(26.7–40.9)	17.4	(12.6–22.2)
Building and grounds cleaning and maintenance occupations (SOC 37)	722	7.4	(4.1–12.9)	2.04	(1.04–4.02)	29.6	(23.8–35.4)	20.7	(13.9–27.5)
Healthcare support occupations (SOC 31)	631	7.0	(4.5–10.8)	1.36	(0.76–2.43)	47.2	(39.6–54.8)	38.8	(30.6–47.0)
Computer and mathematical occupations (SOC 15)	964	6.8	(4.5–10.3)	1.93	(1.12–3.30)	36.0	(30.7–41.3)	20.5	(15.9–25.1)
Production occupations (SOC 51)	1,019	6.6	(4.3–9.8)	1.95	(1.14–3.31)	31.9	(26.7–37.1)	15.6	(11.2–20.0)
Life, physical, and social science occupations (SOC 19)	486	6.3	(3.2–12.3)	1.66	(0.78–3.56)	52.8	(41.7–63.9)	34.8	(23.8–45.8)
Sales and related occupations (SOC 41)	2,344	6.2	(4.6–8.4)	1.69	(1.05–2.72)	29.9	(26.6–33.2)	16.3	(13.3–19.3)
Management occupations (SOC 11)	3,695	5.9	(4.6–7.6)	1.68	(1.09–2.60)	37.5	(34.5–40.5)	22.7	(19.9–25.5)
Education, training, and library occupations (SOC 25)	2,696	5.6	(4.3–7.2)	1.54	(0.99–2.40)	43.0	(39.4–46.6)	25.8	(22.7–28.9)
Construction and extraction occupations (SOC 47)	1,119	5.2	(3.3–8.0)	1.41	(0.80–2.48)	20.4	(15.6–25.2)	11.7	(7.5–15.9)
Legal occupations (SOC 23)	492	4.7	(2.6–8.4)	1.29	(0.64–2.62)	41.2	(32.4–50.0)	23.4	(15.1–31.7)
Office and administrative support occupations (SOC 43)	3,240	4.4	(3.5–5.5)	1.13	(0.74–1.72)	37.3	(33.7–40.9)	21.8	(16.6–27.0)
Transportation and material moving occupations (SOC 53)	1,006	4.3	(2.9–6.4)	1.26	(0.73–2.15)	23.0	(18.3–27.7)	13.4	(9.6–17.2)
Installation, maintenance, and repair occupations (SOC 49)	612	4.3	(2.6–7.0)	1.27	(0.69–2.32)	36.3	(28.8–43.8)	17.0	(10.4–23.6)
Healthcare practitioners and technical occupations (SOC 29)	2,591	3.9	(2.9–5.2)	1.00	(0.62–1.60)	67.0	(63.3–70.7)	50.7	(46.6–54.8)
Architecture and engineering occupations (SOC 17)	752	3.8	(1.8–7.6)	1.08	(0.48–2.40)	32.7	(27.4–38.0)	17.6	(13.1–22.1)
Business and financial operations occupations (SOC 13)	1,588	3.7	(2.6–5.2)	Referent	—	37.1	(32.8–41.4)	17.9	(13.8–22.0)
Farming, fishing, and forestry occupations (SOC 45)	225	3.1	(1.1–8.4)	0.57	(0.22–1.49)	28.0	(15.5–40.5)	14.3	(5.5–23.1)
Protective service occupations (SOC 33)	494	2.8	(1.3–5.8)	0.55	(0.25–1.24)	45.5	(34.8–56.2)	35.5	(26.4–44.6)
Arts, design, entertainment, sports, and media occupations (SOC 27)	737	2.0	(1.1–3.7)	0.57	(0.27–1.17)	31.4	(25.1–37.7)	14.8	(9.9–19.7)

Abbreviations: SOC = Standard Occupational Classification; PR = prevalence ratio; CI = confidence interval.

* Adjusted for interview month.

† Adjusted for interview month, vaccination status (seasonal and pH1N1 influenza), chronic medical conditions (asthma or another lung condition, diabetes, a heart condition, a kidney condition, sickle cell anemia or other anemia, a neurologic or neuromuscular condition, a liver condition, or a weakened immune system caused by a chronic illness or by medicines taken for a chronic illness), and age group.

§ Reference group is "business and financial operations occupations" (SOC 13).

¶ September 2009–June 2010.

** October 2009–June 2010.

Editorial Note

As part of a comprehensive influenza prevention program, the goals of worker vaccination and exposure control measures include 1) protecting the worker, and 2) protecting the public (e.g., patients, students, and customers). Health-care and emergency medical services personnel were one of the initial target groups for 2009 pH1N1 influenza vaccination (*3*). Although other specific groups of civilian workers have not been targeted for influenza vaccination based on industry or occupation, the

What is already known on this topic?

Workers are at risk for becoming infected with influenza from customers and coworkers in the workplace. During the early stages of an influenza pandemic, shortages of vaccine and personal protective equipment can occur, necessitating the prioritization of groups of workers for preventive interventions.

What is added by this report?

During the 2009–10 influenza season, when a global pandemic of novel influenza A (H1N1) was under way, both the prevalence of influenza-like illness in the prior month and the cumulative incidence of seasonal and 2009 pandemic H1N1 influenza (pH1N1) vaccination varied significantly by employment status and among workers in different industry and occupation groups. The highest prevalence of influenza-like illness symptoms was reported by those employed in the industry groups "Real estate and rental and leasing" (10.5%) and "Accommodation and food services" (10.1%), and in the occupation groups "Food preparation and serving related" (10.9%) and "Community and social services" (8.3%). These groups of workers had relatively low levels of both seasonal and pH1N1 influenza vaccination coverage.

What are the implications for public health practice?

Relatively high prevalence rates of influenza-like illness among workers who likely have high exposure to the public and among unemployed adults during the 2009–10 influenza season suggest that these groups might be at increased risk for infection during a pandemic. Employers should evaluate risk levels in workplace settings and implement control measures that include influenza vaccination programs, education on hand hygiene and cough etiquette, encouraging workers to stay home from work when ill, and provision of personal protective equipment.

Occupational Safety and Health Administration's *Guidance for Preparing Workplaces for an Influenza Pandemic* (*4*) recognizes that occupational exposure to influenza during a pandemic "depends in part on whether or not jobs require close proximity to persons potentially infected with the pandemic influenza virus, or whether they are required to have either repeated or extended contact with known or suspected sources of pandemic influenza virus such as coworkers, the general public, outpatients, school children or other such individuals or groups."

This is one of the first reports to describe the prevalence of ILI among I&O groups other than HCP. The relatively high prevalence rates of ILI among workers employed in food service, education, community and social services, personal care, and cleaning and maintenance are consistent with the hypothesis that the risk for acquiring influenza in the workplace is highest for workers with frequent contact with the public and/or fomites and overlap with findings from previous studies (*5,6*). The high prevalence of ILI among workers in the "Real estate and rental and leasing" category was somewhat surprising; however, many of the workers in this industry are employed in "Sales and related" occupations, which might involve contact with infectious customers and fomites. The relatively low vaccination coverage among these I&O groups suggests that their potentially increased risk for infection is not being recognized by the workers themselves or by their employers, who could play a role in providing and promoting vaccination in the workplace.

The findings in this report are subject to at least four limitations. First, all results are based upon self-report, and neither illness nor vaccination status were validated with medical records; not all ILIs are influenza, and respondents might not

TABLE 3. Influenza-like illness (ILI) and seasonal and 2009 pandemic influenza A (H1N1) (pH1N1) vaccination coverage, by employment status — 2009 National H1N1 Flu Survey, United States

Employment status	Unweighted sample size	Weighted prevalence of ILI		Adjusted PR for ILI		Seasonal influenza vaccination coverage		pH1N1 influenza vaccination coverage	
		%	(95% CI)*	PR	(95% CI)†	%	(95% CI)§	%	(95% CI)¶
Employed	28,710	5.5	(5.0–6.0)	0.84	(0.72–0.99)	38.1	(37.0–39.2)	23.7	(22.6–24.8)
Unemployed	3,142	9.4	(7.1–12.3)	1.41	(1.04–1.92)	25.4	(22.2–28.6)	16.7	(13.7–19.7)
Not in labor force**	21,649	6.0	(5.3–6.6)	Referent	—	52.6	(51.1–54.1)	26.5	(25.1–27.9)
Total (all adults)	**56,656††**	**5.9**	**(5.5–6.3)**	—	—	**41.8**	**(41.0–42.6)**	**23.9**	**(23.1–24.7)**

Abbreviations: PR = prevalence ratio; CI = confidence interval.

* Adjusted for interview month.

† Adjusted for interview month, vaccination status (seasonal and pH1N1 influenza), chronic medical conditions (asthma or another lung condition, diabetes, a heart condition, a kidney condition, sickle cell anemia or other anemia, a neurologic or neuromuscular condition, a liver condition, or a weakened immune system caused by a chronic illness or by medicines taken for a chronic illness), and age group.

§ September 2009–June 2010.

¶ October 2009–June 2010.

** Includes homemakers, students, retirees, and adults unable to work.

†† Includes 3,155 adults with missing values for employment status.

have accurately reported which vaccine(s) they received. Second, survey bias might have resulted from the noninclusion of households with no telephone service and the low response rate; although weighting adjustments were made, some bias might remain. Third, differences in the prevalence of ILI and vaccination coverage among workers in different I&O categories might be confounded by other nonoccupational variables for which no adjustment was made (e.g., children in the home). Finally, broad I&O categories were used for this analysis. A drawback to using broad I&O categories is that they aggregate workers who likely have substantially different exposure levels.

Relatively high prevalence rates of ILI among workers who likely have high exposure to the public and among unemployed adults during the 2009–10 influenza season suggest that these groups might be at increased risk for infection during a pandemic. None of these non–health-care worker groups achieved high rates of seasonal or pH1N1 influenza vaccination coverage. On the other hand, the relatively high rates of vaccination coverage among HCP might have contributed to their relatively low rates of ILI. Employers should evaluate risk levels in workplace settings and implement prevention measures that include workplace influenza vaccination programs, education on hand hygiene and cough etiquette, encouraging workers to stay home from work when ill, and provision of personal protective equipment when appropriate. These measures will protect the workers and the public.

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Notes from the Field

Multistate Outbreak of Human *Salmonella* Infections Linked to Live Poultry from a Mail-Order Hatchery in Ohio — March–September 2013

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In early 2013, four clusters of human *Salmonella* infections were identified through PulseNet, the national molecular subtyping network for foodborne bacteria. Many of the ill persons in these four clusters reported contact with live poultry, primarily chicks and ducklings, from a single mail-order hatchery; therefore, these investigations were merged. During March 4–October 9, 2013, a total of 158 persons infected with outbreak strains of *Salmonella* serotypes Infantis, Lille, Newport, and Mbandaka were reported from 30 states.

Forty-two percent (65 of 155) of ill persons were aged ≤10 years, and 28% (29 of 103) were hospitalized; no deaths were reported. Eighty-six percent (80 of 93) of ill persons who were interviewed reported live poultry contact in the week before illness onset. Sixty-nine percent (44 of 64) of ill persons who completed a supplemental live poultry questionnaire reported chick exposure, and 40% (26 of 64) reported duckling exposure. Seventy-five percent (33 of 44) of respondents reported live poultry exposure at their home; 59% (26 of 44) specifically reported keeping poultry inside their home.

Of the 40 ill persons who had recently purchased young poultry, the average time from purchase of poultry to illness onset was 21 days (range = 2–52 days); 48% (19 of 40) ill persons reported illness onset within 2 weeks of poultry purchase. Among persons with purchase information, 94% (62 of 66) reported buying young poultry sourced from a single mail-order hatchery in Ohio.

This outbreak investigation identified an Ohio hatchery as the likely source of the outbreak. This hatchery previously has been linked with multiple, large human *Salmonella* outbreaks (*1*,*2*). These recurring outbreaks highlight the need for comprehensive *Salmonella* prevention and control programs to be implemented and maintained at this mail-order hatchery and its associated breeder farms. Mail-order hatcheries and their source flocks should comply with management and sanitation practices outlined by the U.S. Department of Agriculture's National Poultry Improvement Plan.* Additional owner education is necessary because healthy birds can still transmit *Salmonella* to humans. Educational material warning customers and advising them on how to reduce the risk for *Salmonella* infection from live poultry should be distributed by farm/feed stores and mail-order hatcheries with all live poultry purchases (*3*). Reducing the spread of *Salmonella* in mail-order hatcheries, in their source flocks, and in the feed store environment is critical to reduce the risk for human illness. This outbreak highlights the need for a comprehensive approach involving human and animal health officials and practitioners, industry, and backyard poultry flock owners.

* Additional information available at http://www.aphis.usda.gov/publications/animal_health/content/printable_version/HelpingYouPoultryBreeder-PA1708-FinalJuly09.pdf.

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Announcement

Brain Injury Awareness Month — March 2014

March is Brain Injury Awareness Month. Through scientific research, programs, and education, CDC works to prevent traumatic brain injury (TBI) from all causes and ensure that persons with a TBI receive optimal care. Whether occurring from a fall in the home or on a playground, in sports, in a car crash, or by being struck by an object or another person, a TBI from any cause can disrupt the normal functions of the brain and can range in severity from a mild concussion to a severe, life-threatening injury. Most TBIs can be prevented.

In 2010, in the United States, 2.5 million emergency department visits, hospitalizations, or deaths were associated with TBI, either alone or with other injuries or illnesses. Additionally, research indicates that men in the United States have higher rates of TBI than women. The very young and older adults also have higher rates of TBI resulting from falls. Adults aged ≥65 years have the highest rates of TBI-related hospitalization and are more likely to die from a TBI (either TBI alone or with other injuries or illnesses) than any other age group. Additionally, adolescents and young adults (i.e., persons aged 15–24 years) have the highest rates of motor vehicle–related TBIs.

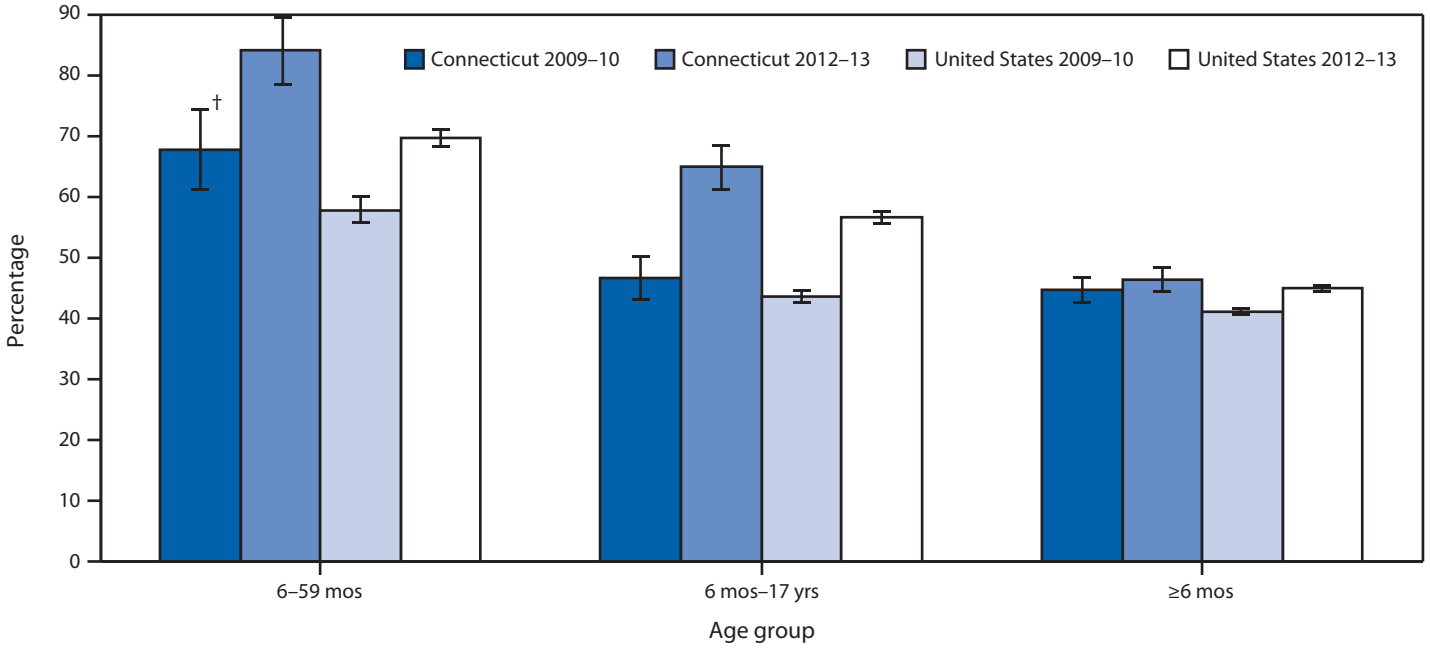
The burden of TBI can be reduced through primary prevention strategies and improvements in the health and quality of life for persons living with a TBI. CDC focuses on integrating public health prevention and health-care delivery systems, including efficient, effective care and rehabilitation services to address the issue of TBI among at-risk populations. Strategies such as buckling children in age- and size-appropriate car seats and starting a regular exercise program to reduce older adult falls are effective ways to reduce the incidence of TBI.Persons with a suspected TBI should receive medical care. Additional information about TBI and its management is available at http://www.cdc.gov/traumaticbraininjury, information about preventing motor vehicle-related TBIs is available at http://www.cdc.gov/motorvehiclesafety, and information about preventing fall-related TBIs is available at http://www.cdc.gov/homeandrecreationalsafety/falls.

Errata

Vol. 63, No. 9

In the report, "Impact of Requiring Influenza Vaccination for Children in Licensed Child Care or Preschool Programs — Connecticut, 2012–13 Influenza Season," on page 183, in the Figure, the groups of vertical bars were labeled incorrectly, and the legend was difficult to follow. The corrected Figure is as follows.

FIGURE. Seasonal influenza vaccination coverage, by age group — Connecticut and United States overall, 2009–10* and 2012–13

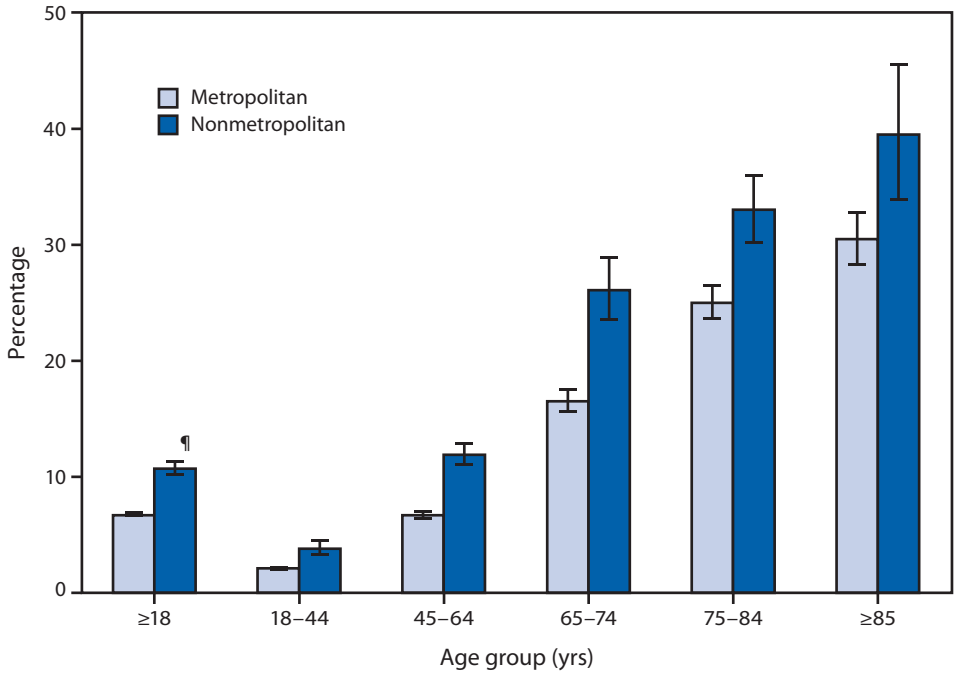


* Vaccination coverage for influenza A (H1N1)pdm09 was not included.
† 95% confidence interval.

QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Percentage of Adults Aged ≥18 Years Who Have Lost All Their Natural Teeth,* by Age Group and Type of Locality† — National Health Interview Survey, United States, 2010–2012§



* Based on response to the question, "Have you lost all of your upper and lower natural (permanent) teeth?"
† The designation of a place of residence as metropolitan or nonmetropolitan is determined by whether the household resides within a metropolitan statistical area, defined as a county or group of contiguous counties that contains at least one urbanized area of ≥50,000 population. Surrounding counties with strong economic ties to the urbanized area are also included. Nonmetropolitan areas do not include a large urbanized area and are generally thought of as more rural.
§ Estimates are based on household interviews of a sample of the civilian, noninstitutionalized U.S. population and are derived from the National Health Interview Survey sample adult component. Estimates for the ≥18 years age category are calculated using age-specific percentages for five age groups: 18–44, 45–64, 65–74, 75–84, and ≥85 years.
¶ 95% confidence interval.

During 2010–2012, the percentage of adults aged ≥18 years who had no natural teeth was higher in nonmetropolitan areas than in metropolitan areas for all age groups. The percentage of adults with no natural teeth also increased steadily with age in metropolitan and nonmetropolitan locations. Among persons aged ≥85 years in nonmetropolitan locations, 40% had lost all their natural teeth, compared with 31% of those in metropolitan areas. Among adults aged 18–44 years, the percentages were 3.8% in nonmetropolitan areas and 2.1% in metropolitan areas.

Sources: National Health Interview Survey, 2010–2012. Available at http://www.cdc.gov/nchs/nhis.htm.

CDC. Health Data Interactive. Available at http://www.cdc.gov/nchs/hdi.htm.

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