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Driving Under the Influence of Alcohol, Marijuana, and Alcohol and Marijuana Combined Among Persons Aged 16–25 Years — United States, 2002–2014

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Motor vehicle accidents are the leading cause of death among youths and young adults aged 16–25 years in the United States (*1*). The prevalence of drinking and driving among high school students aged 16–19 years has declined by 54%, from 22.3% in 1991 to 10.3% in 2011 (*2*). However, the prevalence of weekend nighttime driving under the influence of marijuana (based on biochemical assays) among drivers aged ≥16 years has increased by 48%, from 8.6% in 2007 to 12.6% in 2013–2014 (*3*). Use of marijuana alone and in combination with alcohol has been shown to impair driving abilities (*4–9*). This report provides the most recent self-reported national estimates of driving under the influence of alcohol, marijuana, and alcohol and marijuana combined among persons aged 16–25 years, using data from the Substance Abuse and Mental Health Services Administration (SAMHSA) National Survey on Drug Use and Health (NSDUH) from 2002–2014. Prevalence data on driving under the influence of both substances were examined for two age groups (16–20 years and 21–25 years) and by sex and race/ethnicity. During 2002–2014, the prevalence of driving under the influence of alcohol alone significantly declined by 59% among persons aged 16–20 years (from 16.2% in 2002 to 6.6% in 2014; p<0.001) and 38% among persons 21–25 years (from 29.1% in 2002 to 18.1% in 2014; p<0.001). In addition, the prevalence of driving under the influence of alcohol and marijuana combined significantly declined by 39%, from 2.3% in 2002 to 1.4% in 2014 (p<0.001) among persons aged 16–20 years and from 3.1% in 2002 to 1.9% in 2014 (p<0.001) among persons aged 21–25 years. The prevalence of driving under the influence of marijuana alone declined 18%, from 3.8% in 2002 to 3.1% in 2014 (p = 0.05) only among persons aged 16–20 years. Effective public safety interventions,* such as minimum legal drinking age laws, prohibition of driving with any alcohol level >0 for persons aged <21 years, targeted mass media campaigns, roadside testing (e.g., sobriety checkpoints), and graduated driver licensing programs (*10*) have contributed to the decline in driving under the influence of alcohol in this population. These or similar interventions might be useful to prevent driving under the influence of other substances, such as marijuana alone or combined with other substances.

NSDUH collects annual information about the use of illicit drugs,† alcohol, and tobacco among the noninstitutionalized U.S. civilian population aged ≥12 years via household face-to-face interviews, using a computer-assisted personal interviewing system.§ Unweighted sample sizes for 2002–2014

* Detailed information regarding motor vehicle-related injury prevention by The Community Preventive Services Task Force is available at http://www.thecommunityguide.org/mvoi/AID/index.html.

† Illicit drugs are defined in the NSDUH as marijuana, cocaine (including crack), heroin, hallucinogens, inhalants, or prescription-type psychotherapeutics used nonmedically.

§ Detailed information regarding NSDUH is available at http://www.samhsa.gov/data/population-data-nsduh/reports.

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survey cycles included 383,700 respondents aged 16–25 years. Alcohol use was defined as a report of drinking an alcoholic beverage within the past 12 months. Marijuana use was defined as a report of using marijuana ("pot" or "grass") or hashish ("hash") within the past 12 months. Driving under the influence of alcohol alone was defined as an affirmative response to the question, "During the past 12 months, have you driven a vehicle while you were under the influence of alcohol only?" Driving under the influence of marijuana only was defined as an affirmative response to the survey question, "During the past 12 months, have you driven a vehicle while you were under the influence of illegal drugs only?" (restricted to respondents who reported past-year marijuana use and no other illicit drug use). Driving under the influence of alcohol and marijuana was defined as an affirmative response to the question, "During the past 12 months, have you driven a vehicle while you were under the influence of a combination of alcohol and illegal drugs used together?" (restricted to respondents who reported past-year marijuana use and no other illicit drug use). Respondents who reported past-year marijuana use and did not report the use of any other illegal drugs during the past year, and who reported driving under the influence of drugs in the past year were considered to have driven under the influence of marijuana in the past year. Data on driving under the influence of alcohol alone, marijuana alone, and alcohol and marijuana combined were examined by sex, age, and race/ethnicity. Age was categorized by age of eligibility to drive a motor vehicle (16–20 years) and by legally permitted drinking age (21–25 years). Data were weighted to provide nationally representative estimates. Logistic regression analysis was used to examine temporal trends from 2002–2014 survey cycles; p-values of <0.05 were considered statistically significant.

Overall, in 2014, the reported prevalence of driving under the influence of alcohol alone was greater than that of marijuana alone or alcohol and marijuana combined, and when stratified by sex, age group, and race/ethnicity (Table). During 2002–2014, the reported prevalence of driving under the influence of alcohol alone among persons aged 16–20 years and 21–25 years declined from 16.2% to 6.6% and from 29.1% to 18.1%, respectively (p<0.001 for trend) (Figure 1). In addition, the reported prevalence of driving under the influence of alcohol and marijuana combined among persons aged 16–20 years and 21–25 years declined from 2.3% to 1.4% and 3.1% to 1.9%, respectively (p<0.001 for trend) (Figure 1). Reported prevalence of driving under the influence of marijuana alone did not change significantly during 2002–2014 in either age group. The reported prevalence of driving under the influence of alcohol alone increased with age, from 1.5% among persons aged 16 years to 18.1% among persons aged 21 years (Figure 2).

Discussion

During 2002–2014, the prevalence of driving under the influence of alcohol alone and alcohol and marijuana combined significantly declined among persons aged 16–20 years and 21–25 years. Data from 2014 show that underage (<21 years) drinking and driving does occur at age 16 years and that

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TABLE. Percentage of persons who reported driving a vehicle under the influence of alcohol alone, marijuana alone,* or alcohol and marijuana* combined in the past year, by selected demographic characteristics — National Survey on Drug Use and Health, United States, 2014

Characteristic	Alcohol alone % (95% CI)	Marijuana* alone % (95% CI)	Alcohol and marijuana* combined % (95% CI)
Sex			
Male	13.9 (13.0–14.8)	3.7 (3.3–4.2)	1.9 (1.6–2.3)
Female	10.9 (10.1–11.6)	2.7 (2.4–3.2)	1.3 (1.1–1.6)
Age group (yrs)			
16–20	6.6 (6.0–7.2)	3.1 (2.7–3.6)	1.4 (1.1–1.6)
21–25	18.1 (17.1–19.1)	3.3 (2.9–3.7)	1.9 (1.6–2.3)
Race/Ethnicity			
Non-Hispanic white	14.6 (13.8–15.4)	3.4 (3.0–3.8)	1.5 (1.3–1.8)
Non-Hispanic black	8.4 (7.2–9.8)	4.4 (3.6–5.4)	2.4 (1.8–3.1)
American Indian/Alaska Native	10.2 (6.5–15.6)	1.4 (0.6–3.3)	2.1 (1.1–3.9)
Hawaiian/Other Pacific Islander	9.4 (4.7–18.0)	†	†
Asian	8.9 (6.8–11.5)	1.2 (0.6–2.2)	1.1 (0.5–2.3)
Non-Hispanic, multiracial	12.8 (10.1–16.1)	3.6 (2.4–5.3)	1.6 (0.9–3.0)
Hispanic	10.3 (9.1–11.6)	2.4 (1.8–3.1)	1.5 (1.1–2.0)
Total	**12.4 (11.8–13.0)**	**3.2 (2.9–3.5)**	**1.6 (1.4–1.9)**

Source: Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2002–2014.
Abbreviation: CI = confidence interval.
* Analysis limited to marijuana users.
† Low precision; no estimate reported.

percentages of persons who report driving under the influence of alcohol increase as age increases, peaking at around the minimum legal drinking age (21 years). Because driving under the influence of alcohol, marijuana, or a combination of alcohol and marijuana has been shown to impair some driving abilities (*4*–*9*), additional prevention efforts are needed to further reduce driving under the influence of both substances. Effective strategies to reduce alcohol-impaired driving recommended by the Community Preventive Services Task Force can also be relevant to marijuana impaired driving.

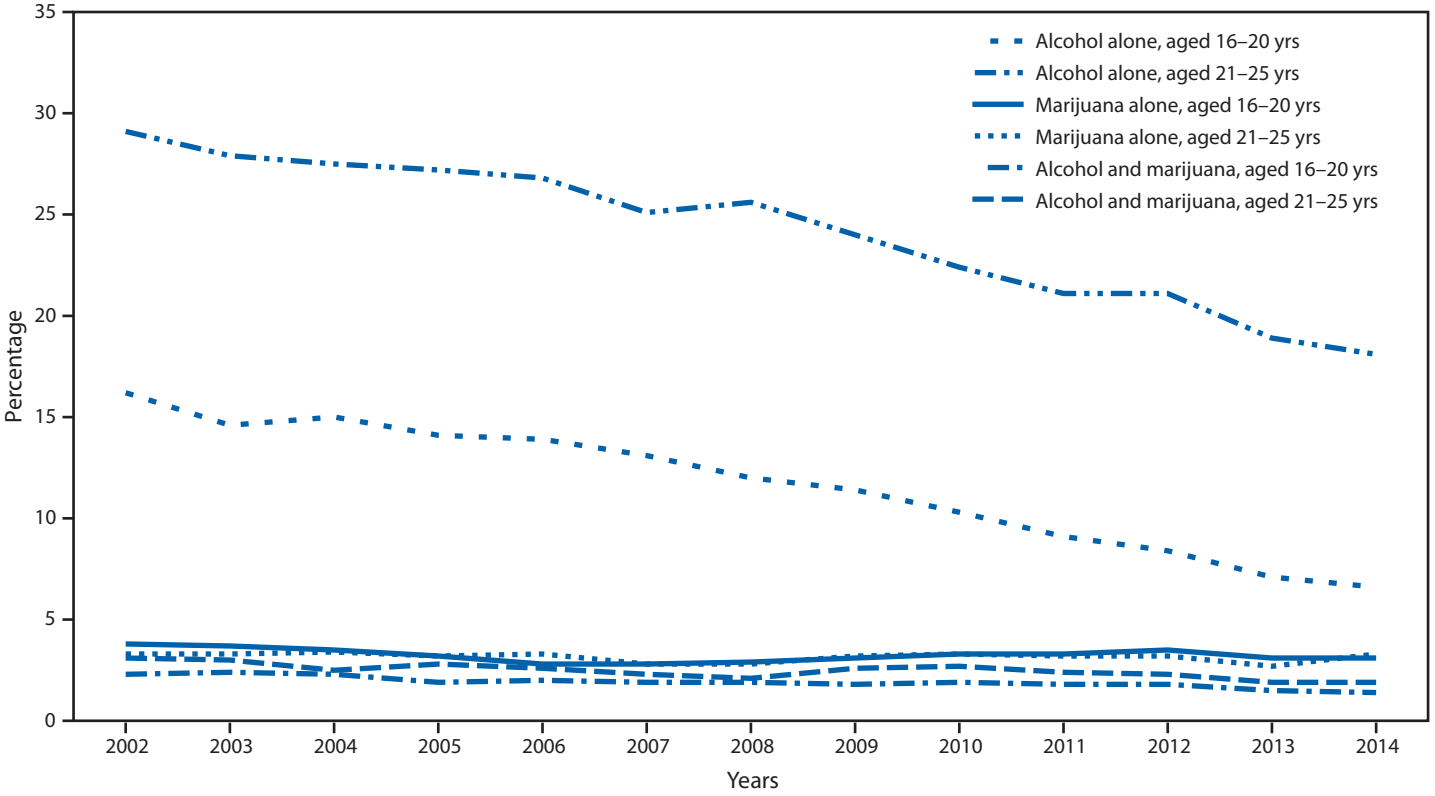
Despite the decline in reported driving under the influence of alcohol alone and alcohol and marijuana combined from 2002 to 2014, data from the 2014 NSDUH[¶] indicate that 60% of young adults aged 18–25 years used alcohol during the past month, 38% engaged in binge drinking,[**] and 20% had used marijuana. Marijuana is the illicit drug most frequently used in this age group. Furthermore, the 2013–2014 National Roadside Survey showed that the prevalence of driving under the influence of marijuana has increased 48% among weekend nighttime drivers aged ≥16 years (*3*). Differences in the findings reported here and those from the National Roadside Survey might be attributable to survey self-reporting bias; what is detected and tested by road law enforcement and what is perceived as driving impairment ("being under the influence") by a survey respondent could be different. Also, the National Roadside Survey might have overestimated the proportion of impaired drivers because it tested for marijuana's psychoactive substances, delta-9-tetrahydrocannabinol (THC) and 11-hydroxy-delta-9-tetrahydrocannabinol, in oral fluids and blood levels. Some psychoactive substances might remain detectable for long periods of time after impairment is no longer present. In addition, the National Roadside Survey only includes weekend nighttime drivers aged ≥16 years. Differences also could represent greater detection of alcohol and drug-positive drivers during weekend nighttime periods (*3*).

Alcohol and marijuana combined have cognitive and psychomotor effects that might impair driving abilities (*4*–*9*). The effects of driving under the influence of both substances on individual persons depend on many factors, including amount consumed or smoked, body mass index, absorption into the bloodstream, age, sex, and alcohol or marijuana use habits and frequency. Road testing for alcohol is commonly implemented and used by law enforcement; however, because no standard measurement to determine marijuana-related driving impairment currently exists, road testing is challenging and practices vary by state. Given the prevalence of alcohol use, binge drinking, and marijuana use among persons aged 18–25 years, additional education, prevention efforts, and additional road safety measures (e.g., sobriety checkpoints, ignition interlock, improved field testing for THC levels, and standards for determining driving impairment) focused on younger adults might be needed to ensure safety among drivers, vehicle occupants, and pedestrians.

The findings in this report are subject to at least four limitations. First, data are self-reported and are subject to recall and social desirability bias, and individual perception of driving impairment. Second, only respondents who reported past-year marijuana use, did not report the use of any other illegal drugs in the past year, and reported driving under the influence of drugs in the past year were coded in the survey as having driven under the influence of marijuana in the past year. Therefore, the estimates of driving under the influence of marijuana alone and combined with alcohol do not include the 35.9% of all marijuana users who reported using some other illicit drug in the past year, and as a result, the estimated number of persons who self-reported driving under the influence of marijuana in the past year likely was underestimated.

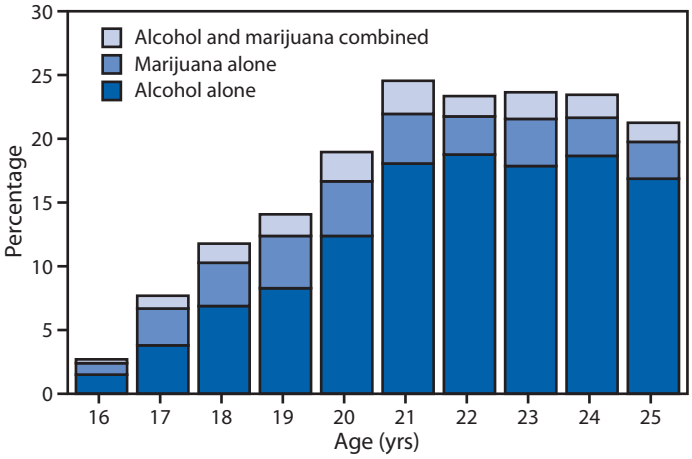
[¶] Behavioral health trends in the United States: results from the 2014 National Survey on Drug Use and Health, available at http://www.samhsa.gov/data/sites/default/files/NSDUH-FRR1-2014/NSDUH-FRR1-2014.pdf.
[**] Binge use of alcohol is defined in NSDUH for both males and females as drinking five or more drinks on the same occasion (i.e., at the same time or within a couple of hours of each other) on at least 1 day in the past 30 days.

FIGURE 1. Percentage of persons who reported driving a vehicle under the influence of alcohol alone, marijuana alone,* and alcohol and marijuana* combined in the past year among persons aged 16–20 years and persons aged 21–25 years — National Survey on Drug Use and Health, United States, 2002–2014



Source: Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2002–2014.
* Analysis limited to marijuana users.

FIGURE 2. Percentage of persons who reported driving a vehicle under the influence of alcohol alone, marijuana alone,* and alcohol and marijuana* combined in the past year by age (years) — National Survey on Drug Use and Health, United States, 2014



Source: Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2002–2014.
* Analysis limited to marijuana users.

Third, given the differences in marijuana legislation among states, some marijuana users could possibly have responded negatively to NSDUH's original question, which might have contributed to underestimation of driving under the influence of marijuana. Finally, currently no level of consumption to determine impairment of driving while under the influence of marijuana exists; therefore, self-reported data are subject to various interpretations of impairment (i.e., being under the influence) among individual users, and likely represent a conservative estimate.

Youth and young adult driving under the influence of any psychoactive substance is an important public health problem that needs the attention of parents, public health officials, law enforcement, and federal and state officials. In addition, alcohol and marijuana initiation might coincide with youths' first driving experiences. Therefore, additional research and surveillance data are needed to better understand the magnitude of the impact of driving under the influence of psychoactive substances, especially marijuana, to ensure public road safety.

Summary

What is already known on this topic?

Motor vehicle accidents are the leading cause of death among youths and young adults aged 16–25 years. Drinking and driving among U.S. high school students aged ≥16 years significantly declined from 1999 to 2011.

What is added by this report?

During 2002–2014, the prevalence of self-reported driving under the influence of alcohol alone among persons aged 16–20 years and 21–25 years significantly declined by 59% and 38%, respectively. In addition, the reported prevalence of driving under the influence of alcohol and marijuana combined significantly declined by 39% in both age groups. The reported prevalence of driving under the influence of alcohol alone increased with age, from 1.5% among persons aged 16 years to 18.1% among persons aged 21 years.

What are the implications for public health practice?

Enforcing effective public health intervention, such as minimum legal drinking age laws, prohibition of driving with any alcohol level >0 for persons aged <21 years, and roadside testing (e.g., sobriety checkpoints), are important for maintaining the declining trends in driving under the influence of alcohol in the United States. Similar interventions might be useful to prevent driving under the influence of other substances, such as marijuana. In addition, improved field testing for marijuana use and standards for driving impairment may be needed in order to ensure public road safety.

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References

1. CDC. Web-based injury statistics query and reporting system (WISQARS). US Department of Health and Human Services, CDC; 2011. Available at http://www.cdc.gov/injury/wisqars/.
2. CDC. Vital signs: drinking and driving among high school students aged ≥16 years—United States, 1991–2011. MMWR Morb Mortal Wkly Rep 2012;61:796–800.
3. Berning A, Compton R, Wochinger K. Results of the 2013–2014 National Roadside Survey of Alcohol and Drug Use by Drivers. Report No. DOT HS 812 118. Washington, DC: US Department of Transportation, National Highway Traffic Safety Administration; 2015.
4. National Institute on Drug Abuse. Research report series: marijuana. Publication No. 15–3859. Bethesda, MD: National Institutes of Health, National Institute on Drug Use; 2015. Available at https://www.drugabuse.gov/sites/default/files/mjrrs_4_15.pdf.
5. Hartman RL, Huestis MA. Cannabis effects on driving skills. Clin Chem 2013;59:478–92.
6. Lenné MG, Dietze PM, Triggs TJ, Walmsley S, Murphy B, Redman JR. The effects of cannabis and alcohol on simulated arterial driving: influences of driving experience and task demand. Accid Anal Prev 2010;42:859–66.
7. Volkow ND, Baler RD, Compton WM, Weiss SR. Adverse health effects of marijuana use. N Engl J Med 2014;370:2219–27.
8. Hartman RL, Brown TL, Milavetz G, et al. Cannabis effects on driving lateral control with and without alcohol. Drug Alcohol Depend 2015;154:25–37.
9. Sewell RA, Poling J, Sofuoglu M. The effect of cannabis compared with alcohol on driving. Am J Addict 2009;18:185–93.
10. Fell JC, Todd M, Voas RB. A national evaluation of the nighttime and passenger restriction components of graduated driver licensing. J Safety Res 2011;42:283–90.

College Sports–Related Injuries — United States, 2009–10 Through 2013–14 Academic Years

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Sports-related injuries can have a substantial impact on the long-term health of student-athletes. The National Collegiate Athletic Association (NCAA) monitors injuries among college student-athletes at member schools. In academic year 2013–14, a total of 1,113 member schools fielded 19,334 teams with 478,869 participating student-athletes in NCAA championship sports (i.e., sports with NCAA championship competition) (*1*). External researchers and CDC used information reported to the NCAA Injury Surveillance Program (NCAA-ISP) by a sample of championship sports programs to summarize the estimated national cumulative and annual average numbers of injuries during the 5 academic years from 2009–10 through 2013–14. Analyses were restricted to injuries reported among student-athletes in 25 NCAA championship sports. During this period, 1,053,370 injuries were estimated to have occurred during an estimated 176.7 million athlete-exposures to potential injury (i.e., one athlete's participation in one competition or one practice). Injury incidence varied widely by sport. Among all sports, men's football accounted for the largest average annual estimated number of injuries (47,199) and the highest competition injury rate (39.9 per 1,000 athlete-exposures). Men's wrestling experienced the highest overall injury rate (13.1 per 1,000) and practice injury rate (10.2 per 1,000). Among women's sports, gymnastics had the highest overall injury rate (10.4 per 1,000) and practice injury rate (10.0 per 1,000), although soccer had the highest competition injury rate (17.2 per 1,000). More injuries were estimated to have occurred from practice than from competition for all sports, with the exception of men's ice hockey and baseball. However, injuries incurred during competition were somewhat more severe (e.g., requiring ≥7 days to return to full participation) than those acquired during practice. Multiple strategies are employed by NCAA and others to reduce the number of injuries in organized sports. These strategies include committees that recommend rule and policy changes based on surveillance data and education and awareness campaigns that target both athletes and coaches. Continued analysis of surveillance data will help to understand whether these strategies result in changes in the incidence and severity of college sports injuries.

During the 5 academic years from 2009–10 through 2013–14, injuries and athlete-exposures were voluntarily reported to NCAA-ISP by participating team athletic trainers, using a web-based platform. The number of teams participating in NCAA-ISP varied by sport and year (*2*). Overall, participation among teams for the study period ranged from a low of 0.7% in men's tennis to a high of 13.2% in men's ice hockey. Data were aggregated across all schools and across all available years for 12 men's championship sports and 13 women's championship sports. Variables examined included the sport, whether the injury occurred during practice or competition, and whether the player required emergency transport, surgery, or ≥7 days before return to full participation. Injuries were defined as those that occurred in an organized NCAA-approved practice or competition and required medical attention by a physician or athletic trainer (*2*). An athlete-exposure was defined as one student-athlete's participation in one practice or one competition. Injury rates were calculated by dividing the number of injuries by the number of athlete-exposures. Competition-to-practice injury rate ratios were calculated by dividing the competition injury rate by the practice injury rate. To create national estimates, each injury and exposure was assigned a sample weight on the basis of the inverse of the school selection probability, using stratifications based on sport, division, and academic year (*3*). The national estimates were then adjusted for potential underreporting (*3*). For example, over the 5-year study period, among the 123 team seasons of men's football from which data were acquired, 8,680 injuries from 899,321 athlete-exposures were reported by participating team athletic trainers. These data, when weighted and adjusted, produced national estimates of 235,993 injuries and 25,770,273 athlete-exposures (or estimated annual averages of 47,199 injuries and 5,154,055 athlete-exposures).

Among all 25 sports, an estimated 28,860,299 practice athlete-exposures and 6,472,952 competition athlete-exposures occurred each year. The 1,053,370 injuries estimated during the 5 academic years studied represented an average of 210,674 total injuries per year (Table 1), among which, 134,498 (63.8%) occurred during practices. Overall, 21.9% of all injuries required ≥7 days before return to full participation (competition: 24.6%; practice: 20.5%) (Figure 1). Among all injuries, those incurred during competition were somewhat more severe than those acquired during practice; overall, 4.0% of injuries required surgery (competition: 5.4%; practice: 3.1%), and 0.9% required emergency transport (competition: 1.4%; practice: 0.6%) (Table 2). These data equated to estimated

TABLE 1. Average annual national estimates of the number of injuries and athlete-exposures, and estimated injury rates, by 25 championship sports — National Collegiate Athletic Association Injury Surveillance Program, United States, 5 academic years, 2009–10 through 2013–14

Season/Sport	Event	Average annual national estimate of no. of injuries	Average annual national estimate of no. of athlete-exposures	Estimated injury rate per 1,000 athlete-exposures (95% CI)
All sports	**Competition**	**76,176**	**6,472,952**	**6.0 (5.9–6.0)**
	Practice	**134,498**	**28,860,299**	
	Overall*	**210,674**	**35,333,250**	
All men's sports	Competition	51,172	3,387,741	6.5 (6.4–6.6)
	Practice	78,829	16,530,517	
	Overall	130,000	19,918,258	
All women's sports	Competition	25,004	3,085,210	5.2 (5.1–5.4)
	Practice	55,670	12,329,782	
	Overall	80,674	15,414,992	
Fall				
Men's football	Competition	19,982	500,698	9.2 (9.0–9.4)
	Practice	27,217	4,653,357	
	Overall	47,199	5,154,055	
Women's field hockey	Competition	642	61,240	6.5 (5.8–7.1)
	Practice	888	174,943	
	Overall	1,530	236,183	
Men's soccer	Competition	6,458	360,880	8.0 (7.5–8.4)
	Practice	6,977	1,323,974	
	Overall	13,435	1,684,854	
Women's soccer	Competition	7,434	432,347	8.4 (8.0–8.8)
	Practice	7,679	1,367,650	
	Overall	15,113	1,799,997	
Women's volleyball	Competition	2,372	403,004	6.4 (6.0–6.8)
	Practice	6,589	988,146	
	Overall	8,961	1,391,150	
Men's cross country	Competition	441	85,226	4.7 (4.1–5.3)
	Practice	3,977	857,815	
	Overall	4,418	943,041	
Women's cross country	Competition	735	94,872	5.3 (4.6–6.0)
	Practice	4,989	983,853	
	Overall	5,723	1,078,724	
Winter				
Men's basketball	Competition	6,259	417,957	8.5 (8.1–8.9)
	Practice	10,349	1,534,919	
	Overall	16,607	1,952,877	
Women's basketball	Competition	4,084	393,620	6.5 (6.1–6.9)
	Practice	6,774	1,277,664	
	Overall	10,858	1,671,284	
Men's wrestling	Competition	2,283	59,312	13.1 (12.3–13.9)
	Practice	5,227	514,972	
	Overall	7,510	574,284	
Women's gymnastics	Competition	175	13,269	10.4 (9.5–11.2)
	Practice	1,195	119,038	
	Overall	1,370	132,307	

See table footnotes on the next page.

annual averages of 46,231 injuries that required ≥7 days before the athlete could return to full participation; 8,367 that required surgery; and 1,904 that required emergency transport. Approximately half of all injuries were diagnosed as sprains or strains (competition: 45.9%; practice: 45.0%) (Table 1). Sprains (including anterior cruciate ligament tears) and strains also accounted for the largest proportions of injuries in competition and practice requiring ≥7 days before return to full participation, (52.1% and 47.8%, respectively) and the largest proportion of injuries requiring surgery (57.7% and 52.9%, respectively). In addition, sprains and strains accounted for the largest proportion of practice-related injuries requiring emergency transport (29.4%); however, during competition, the largest proportions of injuries requiring emergency transport were fractures, stress fractures, dislocations, and subluxations (25.8%), and concussions (22.0%).

Among men's sports, football accounted for the largest percentage of athlete-exposures (14.6% of all athlete-exposures and 31.2% of all male athlete-exposures), and football teams were estimated to have the highest number of injuries per year

TABLE 1. (*Continued*) Average annual national estimates of the number of injuries and athlete-exposures, and estimated injury rates, by 25 championship sports — National Collegiate Athletic Association Injury Surveillance Program, United States, 5 academic years, 2009–10 through 2013–14

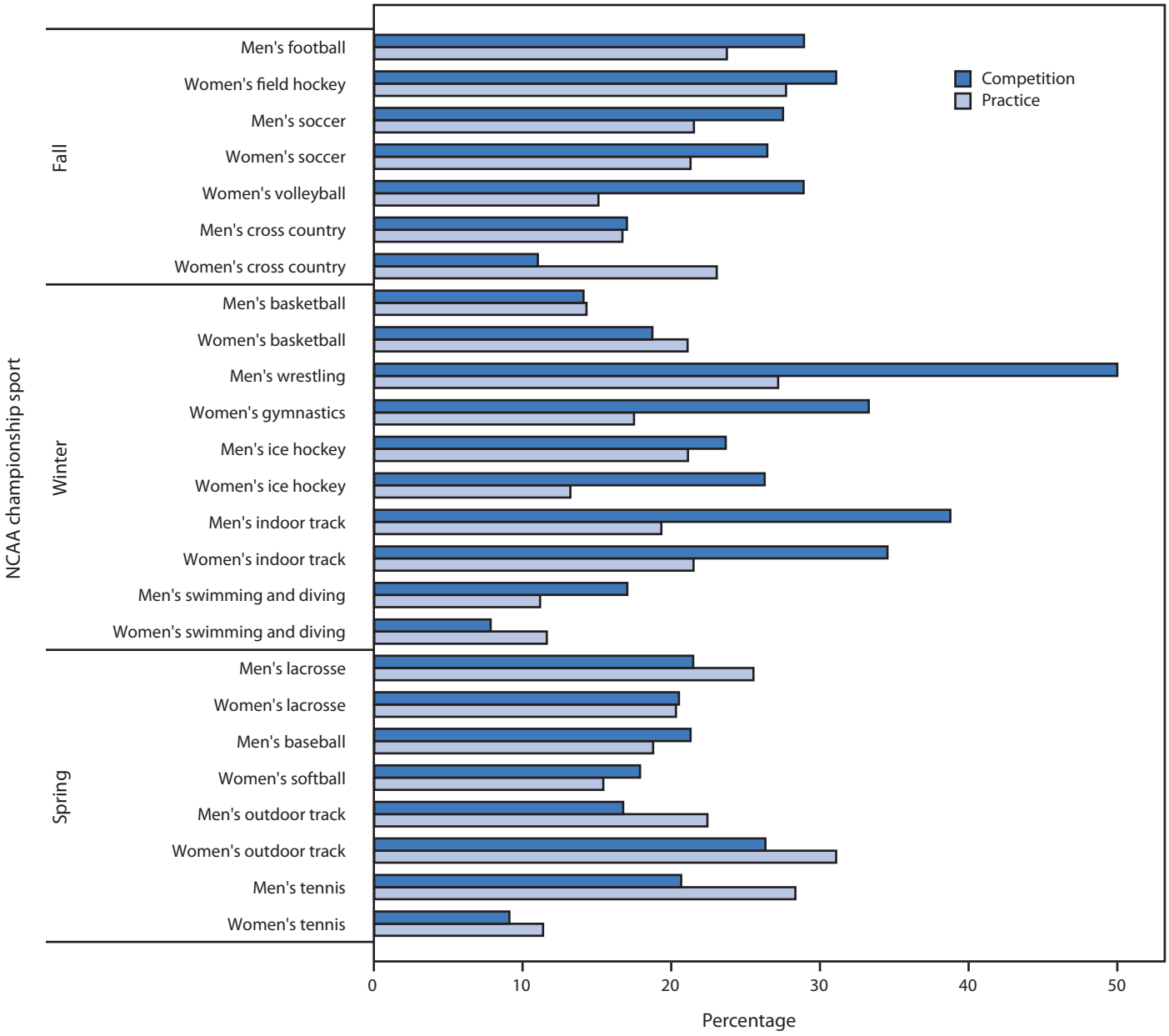
Season/Sport	Event	Average annual national estimate of no. of injuries	Average annual national estimate of no. of athlete-exposures	Estimated injury rate per 1,000 athlete-exposures (95% CI)
Men's ice hockey	Competition	2,450	93,058	9.5 (9.2–9.9)
	Practice	1,233	293,110	
	Overall	3,684	386,168	
Women's ice hockey	Competition	603	53,935	6.1 (5.6–6.6)
	Practice	637	149,463	
	Overall	1,240	203,398	
Men's indoor track	Competition	1,373	211,773	4.0 (3.6–4.4)
	Practice	6,955	1,876,621	
	Overall	8,328	2,088,394	
Women's indoor track	Competition	994	227,565	4.7 (4.3–5.1)
	Practice	10,524	2,205,757	
	Overall	11,519	2,433,322	
Men's swimming and diving	Competition	223	112,986	1.7 (1.5–2.0)
	Practice	1,954	1,133,451	
	Overall	2,177	1,246,437	
Women's swimming and diving	Competition	284	183,840	1.8 (1.6–2.1)
	Practice	3,028	1,619,767	
	Overall	3,312	1,803,607	
Spring				
Men's lacrosse	Competition	2,178	158,541	6.5 (6.1–6.9)
	Practice	3,367	692,681	
	Overall	5,545	851,222	
Women's lacrosse	Competition	1,123	116,314	5.8 (5.3–6.2)
	Practice	2,188	457,330	
	Overall	3,311	573,644	
Men's baseball	Competition	6,916	1,017,899	4.7 (4.3–5.0)
	Practice	6,375	1,833,358	
	Overall	13,292	2,851,256	
Women's softball	Competition	3,797	639,974	4.6 (4.3–5.0)
	Practice	3,832	1,009,896	
	Overall	7,629	1,649,870	
Men's outdoor track	Competition	1,304	239,387	2.7 (2.4–3.1)
	Practice	2,980	1,323,022	
	Overall	4,284	1,562,408	
Women's outdoor track	Competition	1,541	304,598	3.5 (3.0–3.9)
	Practice	4,626	1,473,276	
	Overall	6,167	1,777,874	
Men's tennis	Competition	1,304	130,025	5.7 (4.7–6.6)
	Practice	2,218	493,238	
	Overall	3,522	623,264	
Women's tennis	Competition	1,220	160,631	5.9 (5.1–6.8)
	Practice	2,720	503,000	
	Overall	3,941	663,630	

Abbreviation: CI = confidence interval.
* Sums of competition and practice values do not equal overall values because of rounding.

(47,199; 22.4% of all injuries and 36.3% of all male injuries). Football also had the highest competition injury rate (39.9 injuries per 1,000 athlete-exposures) and competition-to-practice rate ratio (6.8) (Figure 2) and the third highest overall injury rate (9.2 per 1,000) (Table 1). Overall, football accounted for the largest proportions of injuries requiring ≥7 days before return to full participation (26.2%), surgery (40.2%), and emergency transport (31.9%). Men's wrestling had the highest overall injury rate (13.1 per 1,000 athlete-exposures) and the highest practice injury rate (10.2 per 1,000). Swimming and diving had the lowest overall injury rate (1.7 per 1,000). The rates of injury during competition were higher than during practice for all men's sports. However, more injuries occurred in practices than in competitions for all men's sports except ice hockey and baseball.

Among women's sports, soccer accounted for the highest estimated number of injuries per year (15,113), and the highest competition injury rate (17.2 per 1,000); the competition-to-practice rate ratio was 3.1 (Figure 2). Gymnastics had the highest overall injury rate (10.4 per 1,000 athlete-exposures)

FIGURE 1. Percentages of competition and practice injuries requiring ≥7 days before return to full participation, by 25 championship sports — National Collegiate Athletic Association Injury Surveillance Program, United States, 5 academic years, 2009–10 through 2013–14



and practice injury rate (10.0 per 1,000). The lowest overall estimated injury rate (1.8 per 1000) was for swimming and diving. Injury rates were significantly higher during competitions than practices for all women's sports except volleyball, indoor track, and swimming and diving. Compared with practice injuries, a larger proportion of competition injuries required ≥7 days before return to full participation for eight of the 13 women's sports (Figure 1). However, more injuries occurred in practices than in competitions for all women's sports because more than twice as many athlete-exposures each year occurred in practices compared with competition (55,670 versus 25,004).

Among men and women, overall injury rates were similar for soccer, swimming and diving, tennis, and both indoor and outdoor track and field. However, overall injury rates were significantly higher among men than women in basketball, ice hockey, and lacrosse. Overall injury rates were significantly higher among women than men in cross country.

TABLE 2. Cumulative national estimates of the number and percentage of competition and practice injuries, by injury types and selected diagnoses — National Collegiate Athletic Association Injury Surveillance Program, United States, 5 academic years, 2009–10 through 2013–14

	Injury type*			
	Injuries of all severity	Injuries requiring ≥7 days before return to full participation	Injuries requiring surgery	Injuries requiring emergency transport
Activity type/Diagnosis	No. (%)	No. (%)	No. (%)	No. (%)
Competition				
Concussion	26,394 (6.9)	14,888 (15.9)	96 (0.5)	1,174 (22.0)
Contusion	69,406 (18.2)	4,956 (5.3)	257 (1.2)	512 (9.6)
Fracture/Stress fracture/Dislocation/Subluxation	26,989 (7.1)	12,525 (13.4)	5,158 (24.9)	1,378 (25.8)
Inflammatory condition	22,918 (6.0)	3,272 (3.5)	376 (1.8)	39 (0.7)
Sprain/Strain	174,845 (45.9)	48,761 (52.1)	11,949 (57.7)	1,082 (20.2)
Other	60,327 (15.8)	9,189 (9.8)	2,868 (13.9)	1,158 (21.7)
Total	**380,879 (100.0)**	**93,591 (100.0)**	**20,704 (100.0)**	**5,342 (100.0)**
Practice				
Concussion	26,408 (3.9)	16,384 (11.9)	92 (0.4)	348 (8.3)
Contusion	49,781 (7.4)	4,198 (3.1)	410 (1.9)	355 (8.5)
Fracture/Stress fracture/Dislocation/Subluxation	38,292 (5.7)	15,817 (11.5)	4,558 (21.6)	734 (17.6)
Inflammatory condition	99,758 (14.8)	12,586 (9.1)	1,190 (5.6)	0 (—)
Sprain/Strain	302,288 (45.0)	65,736 (47.8)	11,188 (52.9)	1,228 (29.4)
Other	155,965 (23.2)	22,845 (16.6)	3,694 (17.5)	1,513 (36.2)
Total	**672,491 (100.0)**	**137,566 (100.0)**	**21,133 (100.0)**	**4,178 (100.0)**

* Categories are not mutually exclusive.

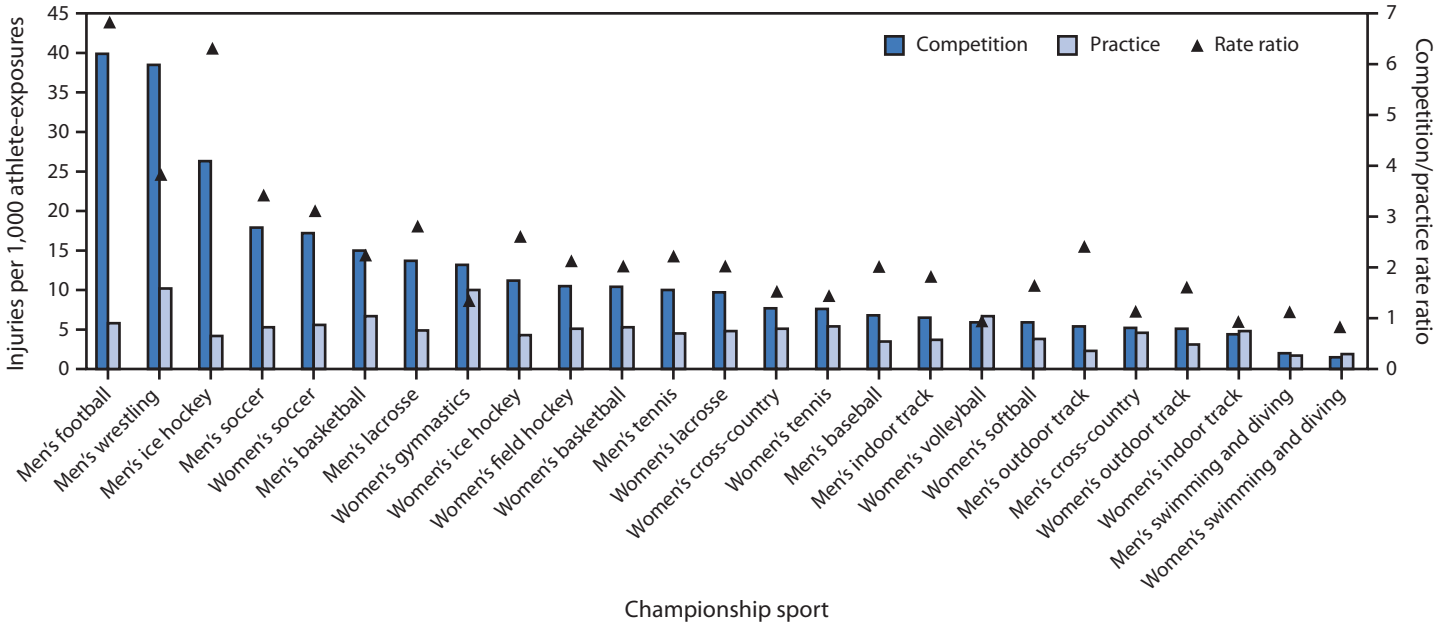
Discussion

Men's football accounts for the most college sport injuries each year, as well as the largest proportions of injuries requiring ≥7 days before return to full participation, or requiring surgery or emergency transport. Thus, prevention efforts that focus on football will target the largest number of severe injuries. The large overall number of football-related injuries is attributable to football having the largest number of student-athletes (71,291 during the 2013–14 academic year) among all 25 reported NCAA sports (16.1%) (*2*). Although wrestling had the highest overall injury rate among all 25 reported NCAA sports, the number of student-athlete wrestlers was much smaller (6,982). At the same time, the competition injury rates in wrestling and football were nearly equivalent, although the practice injury rate in wrestling was higher than that in football. Among women's sports, gymnastics had the highest rate of injury each year, whereas soccer contributed the largest number of injuries. Many of these data are consistent with earlier reports and can be used to guide resource allocation decisions and research to identify specific risk factors or to evaluate prevention measures (*4*). It is also important to note that the injury rates reported from these data are higher than those reported from NCAA-ISP before 2004–05 (*4*) because, unlike previous estimates, rates since the 2009–10 academic year have included injuries requiring <1 day before return to full participation.

The relationship between injury numbers and rates in practice and competition is similar to previous findings (*4*). Competition injury rates were higher than practice injury rates, and more than five-fold higher for men's football and ice hockey. This difference might be attributable to a higher intensity of activity during competitions compared with practices; in most sports, the proportion of injuries requiring ≥7 days before return to full participation was higher in competitions than in practices. However, a larger number of injuries occurred during practices than competition, because there were nearly 4.5 times as many practice athlete-exposures as competition athlete-exposures. Approximately one in five practice injuries required ≥7 days before return to full participation. Major injuries, such as concussion or those resulting in surgery or emergency transport, occurred commonly in both competition and practice. Injury prevention strategies that target not only competition, but also the more controlled practice environment, might provide additional opportunities to reduce injury incidence.

The findings in this report are subject to at least four limitations. First, not all sports have athletic trainers present at every practice; therefore, practice and overall injury rates might be underreported and thus underestimated in certain sports. Second, these data are descriptive and cannot be used to ascertain reasons for the various injury rates. Third, multiple years of data were required to be combined to provide stable

FIGURE 2. Competition and practice injury rates per 1,000 athlete-exposures and competition/practice rate ratios, by 25 championship sports — National Collegiate Athletic Association Injury Surveillance Program, United States, 5 academic years, 2009–10 through 2013–14



annual estimates. For methodologic reasons, it cannot be ascertained whether rates have changed over time. Additional years of injury surveillance will aid detection of changes in injury incidence and severity. Finally, although weights were used to calculate national rate estimates, these data are drawn from reports from participating teams, which amounts to a convenience sample and not a random sample. Thus, these data might not be generalizable to all teams in all NCAA member schools.

Sports injury data, such as those collected by NCAA-ISP, have been used to describe the incidence of injury, develop and evaluate various rule and policy changes (e.g., changing football kickoff and touchback yard lines to reduce injuries*), guide resource allocation, and focus injury prevention efforts (*2*,*4*–*10*). NCAA-ISP data are now available online to researchers to aid in their analyses of sports injuries and in their development of strategies for injury prevention.†

* Additional information available at http://www.ncaa.org/about/resources/media-center/news/playing-rules-oversight-panel-approves-rules-changes-football.
† Additional information available at http://www.datalyscenter.org/index.php.

Summary

What is already known on this topic?

The risk for injury to college athletes varies by the sport played, the sex of the athlete, and whether the athlete is engaged in practice or competition.

What is added by this report?

Data from the National Collegiate Athletic Association Injury Surveillance Program indicate that, among men's sports, the highest injury rates are in football and wrestling. For women, the highest injury rates are in soccer and gymnastics. Estimated injury rates are higher during competition than during practice. However, the majority of injuries overall and within most sports occur during practices because they are conducted more frequently than competitions.

What are the implications for public health practice?

Injury prevention strategies that target practices as well as competitions might provide additional opportunities for reduction in injury incidence. Injury surveillance data can be used to compare injury incidence across sports, develop and evaluate rule and policy changes, and focus injury prevention research and programs. Continual analysis of surveillance data will help to understand changes in the incidence and severity of college sports injuries.

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References

1. National Collegiate Athletic Association. Sports sponsorship and participation rates. Indianapolis, IN: National Collegiate Athletic Association; 2014. Available at http://www.ncaa.org/about/resources/research/sports-sponsorship-and-participation-research.
2. Kerr ZY, Dompier TP, Snook EM, et al. National collegiate athletic association injury surveillance system: review of methods for 2004–2005 through 2013–2014 data collection. J Athl Train 2014;49:552–60.
3. Kucera KL, Marshall SW, Bell DR, DiStefano MJ, Goerger CP, Oyama S. Validity of soccer injury data from the National Collegiate Athletic Association's Injury Surveillance System. J Athl Train 2011;46:489–99.
4. Hootman JM, Dick R, Agel J. Epidemiology of collegiate injuries for 15 sports: summary and recommendations for injury prevention initiatives. J Athl Train 2007;42:311–9.
5. Gilchrist J, Mandelbaum B, Melancon H, et al. A randomized controlled trial to prevent non-contact ACL injury in female collegiate soccer players. Am J Sports Med 2008;36:1476–83.
6. Reider B. An ounce of prevention. Am J Sports Med 2004;32:1383–4.
7. Dick R, Putukian M, Agel J, Evans TA, Marshall SW. Descriptive epidemiology of collegiate women's soccer injuries: National Collegiate Athletic Association Injury Surveillance System, 1988–1989 through 2002–2003. J Athl Train 2007;42:278–85.
8. Marshall SW, Covassin T, Dick R, Nassar LG, Agel J. Descriptive epidemiology of collegiate women's gymnastics injuries: National Collegiate Athletic Association Injury Surveillance System, 1988–1989 through 2003–2004. J Athl Train 2007;42:234–40.
9. Yard EE, Comstock RD. Compliance with return to play guidelines following concussion in US high school athletes, 2005–2008. Brain Inj 2009;23:888–98.
10. Parker EM, Gilchrist J, Schuster D, Lee R, Sarmiento K. Reach and knowledge change among coaches and other participants of the online course: "concussion in sports: what you need to know." J Head Trauma Rehabil 2015;30:198–206.

Syringe Service Programs for Persons Who Inject Drugs in Urban, Suburban, and Rural Areas — United States, 2013

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Reducing human immunodeficiency virus (HIV) infection rates in persons who inject drugs (PWID) has been one of the major successes in HIV prevention in the United States. Estimated HIV incidence among PWID declined by approximately 80% during 1990–2006 (*1*). More recent data indicate that further reductions in HIV incidence are occurring in multiple areas (*2*). Research results for the effectiveness of risk reduction programs in preventing hepatitis C virus (HCV) infection among PWID (*3*) have not been as consistent as they have been for HIV; however, a marked decline in the incidence of HCV infection occurred during 1992–2005 in selected U.S. locations when targeted risk reduction efforts for the prevention of HIV were implemented (*4*). Because syringe service programs (SSPs)* have been one effective component of these risk reduction efforts for PWID (*5*), and because at least half of PWID are estimated to live outside major urban areas (*6*), a study was undertaken to characterize the current status of SSPs in the United States and determine whether urban, suburban, and rural SSPs differed. Data from a recent survey of SSPs† were analyzed to describe program characteristics (e.g., size, clients, and services), which were then compared by urban, suburban, and rural location. Substantially fewer SSPs were located in rural and suburban than in urban areas, and harm reduction services§ were less available to PWID outside urban settings. Because increases in substance abuse treatment admissions for drug injection have been observed concurrently with increases in reported cases of acute HCV infection in rural and suburban areas (*7*), state and local jurisdictions could consider extending effective prevention programs, including SSPs, to populations of PWID in rural and suburban areas.

The basic service offered by SSPs allows PWID to exchange used needles and syringes for new, sterile needles and syringes. Providing sterile needles and syringes and establishing appropriate disposal procedures substantially reduces the chances that PWID will share injection equipment and removes potentially HIV- and HCV-contaminated syringes from the community. Many SSPs have become multiservice organizations, providing various health and social services to their participants (*8*). HIV and HCV testing and linkage to care and treatment for substance use disorders are among the most important of these other services. The availability of new and highly effective curative therapy for HCV infection increases the benefits of integrating testing and linkage to care among the services provided by SSPs.

During the last decade, an increase in drug injection has been reported in the United States, primarily the injection of prescription opioids and heroin among persons who started opioid use with oral analgesics and transitioned to injecting (*9*). Much of this drug injection has occurred in suburban and rural areas (*6*). Outbreaks of HCV infection, and more recently HIV infection, in these nonurban areas have been correlated with these injection patterns and trends (*7*).

The recent HIV outbreak in Scott County, Indiana (*10*), and the emerging HCV epidemics in multiple areas throughout the United States (*11*) have focused attention on the limited coverage of prevention services for both types of infections among PWID in rural and suburban areas. This report summarizes data from a survey of U.S. SSPs, and compares selected characteristics of these programs by urbanicity.

As of March 2014, 204 SSPs were known to be operating in the United States in 2013 (*2*). Directors of 153 (75%) of these programs participated in a mail/telephone survey covering program operations for 2013, conducted by the North American Syringe Exchange Network and Mount Sinai Beth Israel (New York, New York). Research personnel conducted follow-up telephone interviews with program directors for response clarification and completeness.

Because some SSPs do not collect individual client-level data (e.g., characteristics and behaviors of persons who exchanged syringes or used other services) to protect participant confidentiality, the survey asked program directors for their best estimates of demographic characteristics and behaviors of their client populations. In addition, when SSPs had multiple sites within their specific service area, the directors were asked to describe program and client characteristics for the entire population served, rather than for individual sites. Thus, the data in this report refer to each program as a whole. Program directors also were asked whether their main site of operations

* The use of federal funding for SSP implementation is prohibited.

† Although the survey collects data on syringe exchange programs, these programs can include a range of services, such as HIV or HCV testing, linkage to care, and drug treatment. The term SSP is used to include services beyond the provision of sterile needles and syringes.

§ Harm reduction encompasses a wide array of services including syringe exchange, outreach and peer education, opioid substitution therapies, counseling and testing for HIV, hepatitis, sexually transmitted or blood borne infections, wound care, overdose prevention, primary medical care, and referrals to drug treatment. These are provided without requiring that the person stop using drugs.

(including mobile operations if applicable) was located in an urban, suburban, or rural setting. The data collection and analysis for this report were conducted during the spring and summer of 2014 using methods similar to those used in previous SSP surveys (*12*). Program, client, and operating characteristics are reported as percentages by urban, suburban, and rural setting.

The West and Northeast had the highest numbers of SSPs, and the South had the lowest (Table 1). Nationally, 20% of SSPs reported primary rural locations, 9% reported primary suburban locations, and 69% reported primary urban locations with slightly less than 3% with missing location data. There was some variation in the percentage of rural, suburban, and urban programs among the geographic regions, with the West and Midwest having a higher percentage of rural programs, the South and Northeast having the highest percentage of urban programs, and the South having the lowest percentage of rural and suburban SSPs.

Rural SSPs exchanged fewer syringes than suburban and urban SSPs. Because there were many more urban SSPs, they dominated the total number of syringes exchanged (31.5 million by urban programs versus 4.4 million for suburban programs and 2.7 million for rural programs). Annual budgets for SSPs paralleled the number of syringes exchanged, with rural programs having modest budgets (mean = $26,023), suburban programs having much larger budgets (mean = $116,902), and the urban programs having the largest budgets (mean = $184,738). Urban programs dominated the total budgets for SSPs in the survey, accounting for 83% of budgeted funds. The percentage of SSPs receiving public funding (from local and state governments) was similar across SSP locations (60% for rural, 64% for suburban, and 60% for urban SSPs).

Although a greater percentage of SSP participants were male, a substantial minority (>30%) were female (Table 2). Compared with rural and suburban SSPs, urban SSPs reported considerably higher percentages of African American and

TABLE 1. Program characteristics, by syringe service program location — United States, 2013

	SSP location				
	Rural	Suburban	Urban	Missing data*	U.S. total
Program characteristic	**No. (%)**	**No. (%)**	**No. (%)**	**No.**	**No.**
Region					
Midwest	6 (20)	1 (3)	23 (77)	0	**30**
Northeast	4 (9)	4 (9)	35 (81)	0	**43**
Puerto Rico	1 (20)	0 (0)	4 (80)	0	**5**
South	1 (7)	0 (0)	12 (86)	1	**14**
West	18 (30)	9 (15)	31 (51)	3	**61**
Total	**30 (20)**	**14 (9)**	**105 (69)**	**4**	**153**
Program size (no. of syringes distributed)					
Small (1–9,999)	5 (17)	1 (7)	6 (6)	0	**12**
Medium (10,000–55,000)	10 (33)	4 (29)	21 (20)	0	**35**
Large (55,001–499,999)	14 (47)	6 (43)	60 (57)	2	**82**
Very large (≥500,000)	0 (0)	3 (21)	16 (15)	2	**21**
None/unknown/missing	1 (3)	0 (0)	2 (2)	0	**3**
Total	**30 (100)**	**14 (100)**	**105 (100)**	**4**	**153**
No. of syringes exchanged					
No. of SSPs† reporting no. of syringes	29	14	103	4	**150**
Median no. of syringes per SSP	55,000	82,681	146,263	1,826,977	**121,880**
Mean no. of syringes per SSP	91,536	313,555	305,694	1,834,533	**305,793**
Total no. of syringes	**2,654,551**	**4,389,770**	**31,486,507**	**7,338,132**	**45,868,960**
Total SSP funding§					
Mean cost per SSP	$26,023	$116,902	$184,738	$501,033	**$155,466**
Total cost for SSP location	**$676,590**	**$1,636,630**	**$18,104,328**	**$1,503,100**	**$21,920,648**
Public funding of SSP (city, county, and state funding)¶					
Yes	18 (60)	9 (64)	63 (60)	3	**93**
No	8 (27)	5 (36)	35 (33)	0	**48**
Unknown/missing	4 (13)	0 (0)	7 (7)	1	**12**
Total	**30 (100)**	**14 (100)**	**105 (100)**	**4**	**153**

Source: Mount Sinai Beth Israel, New York, NY; North American Syringe Exchange Network.
Abbreviation: SSP = syringe service program.
* Data on location missing for four SSPs.
† Two SSPs did not report the number of syringes distributed, and one SSP reported zero syringes distributed (not operational).
§ Twelve SSPs did not report total SSP funding.
¶ The use of federal funding for SSP implementation is prohibited.

Hispanic participants and smaller percentages of white participants, although whites were still the majority of participants in all SSPs. Heroin was the most frequently injected drug for all three types of SSP locations, with approximately two thirds of participants injecting heroin in suburban and urban SSPs, and approximately one half in rural SSPs. Rural SSPs reported higher percentages of participants injecting amphetamines and opioid analgesics.

Regardless of location, most SSPs encouraged secondary exchange, in which persons attending the program exchange used needles and syringes on behalf of peers who do not personally attend the program (Table 3). In addition, a majority of SSPs in all location types reported experiencing funding and resource shortages in 2013, although the percentage was slightly higher for rural exchanges. Suburban SSPs were most likely to report difficulties in reaching (e.g., making initial contact) and recruiting potential participants. Differences in personnel patterns also were apparent. Among rural SSPs, approximately 40% reported having full-time paid personnel, and approximately one half reported former drug users as program personnel. Conversely, among suburban and urban SSPs, most reported employing former drug users.

Despite differences in program size, operating budgets, and staffing among SSPs in rural, suburban, and urban locations, there were similarities in on-site services (Table 3). Most SSPs offered HIV counseling and testing (87% among rural SSPs, 71% among suburban SSPs, and 90% among urban SSPs) and HCV testing (67% among rural SSPs, 79% among suburban SSPs, and 78% among urban SSPs). A minority of SSPs reported having referral tracking systems for HCV-related care and treatment (33% of rural SSPs, 43% of suburban SSPs, and 44% of urban SSPs). Rural SSPs were less likely to provide naloxone (for reversing opioid overdoses) (37%) compared with suburban (57%) and urban (61%) programs that provided this service.

Discussion

A recent estimate of the geographic variation among PWID indicated that half lived outside of major metropolitan areas (*6*). Opiate overdoses and prescription opiate use have been increasing particularly in rural areas (*13*). The modest number of rural (20) and suburban (14) SSPs participating in this survey raise concerns that many rural and suburban areas with PWID might not have access to SSPs. Unmet needs for SSPs were recently documented in Kentucky, Tennessee, Virginia,

TABLE 2. Reported client characteristics, by syringe service program location — United States, 2013

	SSP location		
	Rural (n = 30)	Suburban (n = 14)	Urban (n = 105)
Client characteristic	Mean % of participants	Mean % of participants	Mean % of participants
Gender			
Male	61	67	65
Female	39	32	31
Transgender	0	1	3
Race/Ethnicity			
African American	2	7	16
Asian/Pacific Islander	1	1	1
White	80	72	56
Hispanic	11	12	22
Native American	4	5	2
Biracial/Mixed	2	2	2
Other	0	2	1
Types of drugs injected			
Heroin by itself	48	69	63
Heroin and cocaine	9	6	21
Heroin mixed with other drug (not cocaine)	12	4	11
Cocaine by itself	10	6	13
Methamphetamine (crystal methamphetamine/ice/crank)	25	18	12
Other opiates (oxycodone)	25	13	15
Steroids	1	1	2

Source: Mount Sinai Beth Israel, New York, NY; North American Syringe Exchange Network.
Abbreviation: SSP = syringe service program.

TABLE 3. Selected syringe service program operating characteristics and selected services, by syringe service program location — United States, 2013

	SSP location		
	Rural (n = 30)	Suburban (n = 14)	Urban (n = 105)
Characteristic	%	%	%
Operating characteristic			
Syringes estimated to be distributed via secondary exchange, peer delivery services, or both	30	28	20
SSPs encouraged secondary exchange	73	79	71
Mobile exchange	23	71	74
Experienced a lack of resources/funding	73	64	63
Experienced problems reaching, recruiting participants, or both	20	36	18
Full-time paid personnel	40	79	77
Former drug users as program personnel	50	86	70
Selected service			
HIV counseling and testing	87	71	90
HCV testing	67	79	78
Sexually transmitted diseases screening	40	29	50
HCV referral tracking	33	43	44
Distribution of food	33	29	54
Distribution of naloxone	37	57	61
Referral to methadone, buprenorphine, maintenance or both	70	86	90

Source: Mount Sinai Beth Israel, New York, NY; North American Syringe Exchange Network.
Abbreviations: HCV = hepatitis C virus; HIV = human immunodeficiency virus; SSP = syringe service program.

and West Virginia. CDC reported large increases in HCV infection (primarily associated with injection drug use) in these four states during 2006–2012 (*7*). During the time of this increase, only one SSP was known to be operating in the four states combined, and state-supported SSPs were not officially authorized in any of the states (*2*). Kentucky and Indiana recently authorized SSPs, after the Indiana HIV outbreak (*10*).

The existence of an SSP in an area, however, will not necessarily prevent an outbreak of HIV or HCV infection; in addition to substance use prevention and treatment services, PWID need access to adequate numbers of sterile syringes. The Joint United Nations Programme on HIV/Acquired Immunodeficiency Syndrome (AIDS) (UNAIDS) recommends provision of 200 sterile syringes per injector per year for a high level of coverage.¶ Access to sterile syringes can be provided through SSPs and through pharmacy sales. Each of these settings has advantages and limitations. Pharmacies have many locations and longer hours of operation, but they usually do not collect used needles and syringes and typically do not ensure client confidentiality. SSPs can provide free sterile needles and syringes and certain additional services, including the collection of used needles and syringes, and they might be more effective in protecting confidentiality of injectors. Selected services are frequently provided by SSPs to improve the health of clients, prevent infectious diseases, and reduce drug use, and can be considered a minimum set for good quality service (Table 3) (*8*). Good practice also includes treating clients with respect and protecting client confidentiality.

The findings in this report are subject to at least four limitations. First, only 75% of SSPs in the United States participated in the survey, and some of the participating SSPs requested that their data (including their location) not be made public; however, based on previous surveys of SSPs (*12*), those that do not participate tend to be small programs. Therefore, the survey likely represents the majority of SSP activities nationally. Second, participant characteristics and drug use behaviors were estimated by program directors rather than abstracted or enumerated from program records. Third, the data on service provision considered whether each service was provided and did not assess quantity or quality of the specific service. Finally, some programs with multiple sites operated in more than one type of location, and there might be some misclassification of program location. The most likely direction of such misclassification would be nonurban operations that were part of programs with urban primary locations.

Despite these limitations, the survey data indicated distinct differences (location, size, budgets, staffing, and drugs injected) and some important similarities (offering HIV and HCV testing) among the programs. HIV prevention for PWID has been successful where it has been implemented in the United States. During the last decade, however, injection drug use has increased in many new areas, particularly rural and suburban communities, where HIV and hepatitis C prevention programs and services are often lacking. Providing all populations of PWID in the United States with access to sterile injection equipment as well as comprehensive treatment and prevention services for drug use and HIV and HCV infection could help prevent worsening of these epidemics.

Summary

What is already known on this topic?

Syringe service programs (SSPs) have been one important component of successful efforts to reduce human immunodeficiency virus (HIV) transmission among persons who inject drugs (PWID). Recently, injection drug use, primarily the injection of prescription opioids and heroin by persons who started opioid use with oral analgesics, has increased in suburban and rural areas in the United States. Outbreaks of HIV and hepatitis C virus (HCV) infection in these nonurban areas have been correlated with these injection trends.

What is added by this report?

A survey of SSPs identified notable differences (e.g., location, size, budgets, staffing, and drugs injected) and certain key similarities (e.g., offering HIV and HCV testing) among urban and nonurban SSPs. Substantially fewer SSPs were located in rural or suburban than in urban areas, making harm reduction services less available to PWID outside urban settings.

What are the implications for public health practice?

To continue to reduce HIV and prevent HCV transmission among PWID, state and local jurisdictions could consider extending effective prevention programs, including SSPs, to populations of PWID in rural and suburban areas.

¶ Additional information available at http://www.unaids.org/sites/default/files/media_asset/05_Peoplewhoinjectdrugs.pdf.

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References

1. Hall HI, Song R, Rhodes P, et al. Estimation of HIV incidence in the United States. JAMA 2008;300:520–9.
2. Bramson H, Des Jarlais DC, Arasteh K, et al. State laws, syringe exchange, and HIV among persons who inject drugs in the United States: history and effectiveness. J Public Health Policy 2015;36:212–30.
3. Holtzman D, Barry V, Ouellet LJ, et al. The influence of needle exchange programs on injection risk behaviors and infection with hepatitis C virus among young injection drug users in select cities in the United States, 1994–2004. Prev Med 2009;49:68–73.
4. CDC. Surveillance for acute viral hepatitis—United States, 2007. MMWR Morb Mortal Wkly Rep 2009;58(No. SS-3).
5. Hagan H, Pouget ER, Des Jarlais DC. A systematic review and meta-analysis of interventions to prevent hepatitis C virus infection in people who inject drugs. J Infect Dis 2011;204:74–83.
6. Oster AM, Sternberg M, Lansky A, Broz D, Wejnert C, Paz-Bailey G. Population size estimates for men who have sex with men and persons who inject drugs. J Urban Health 2015;92:733–43.
7. Zibbell JE, Iqbal K, Patel RC, et al. Increases in hepatitis C virus infection related to injection drug use among persons aged ≤30 years—Kentucky, Tennessee, Virginia, and West Virginia, 2006–2012. MMWR Morb Mortal Wkly Rep 2015;64:453–8.
8. Des Jarlais DC, McKnight C, Goldblatt C, Purchase D. Doing harm reduction better: syringe exchange in the United States. Addiction 2009;104:1441–6.
9. Lankenau SE, Teti M, Silva K, Jackson Bloom J, Harocopos A, Treese M. Initiation into prescription opioid misuse amongst young injection drug users. Int J Drug Policy 2012;23:37–44.
10. Conrad C, Bradley HM, Broz D, et al. Community outbreak of HIV infection linked to injection drug use of oxymorphone—Indiana, 2015. MMWR Morb Mortal Wkly Rep 2015;64:443–4.
11. Suryaprasad AG, White JZ, Xu F, et al. Emerging epidemic of hepatitis C virus infections among young nonurban persons who inject drugs in the United States, 2006–2012. Clin Infect Dis 2014;59:1411–9.
12. CDC. Syringe exchange programs—United States, 2008. MMWR Morb Mortal Wkly Rep 2010;59:1488–91.
13. Havens JR, Young AM, Havens, CE. Nonmedical prescription drug use in a nationally representative sample of adolescents: evidence of greater use among rural adolescents. Arch Pediatr Adolesc Med 2011;165:250–5.

Update: Influenza Activity — United States, October 4–November 28, 2015

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CDC collects, compiles, and analyzes data on influenza activity year-round in the United States. The influenza season generally begins in the fall and continues through the winter and spring months; however, the timing and severity of circulating influenza viruses can vary by geographic location and season. Influenza activity in the United States remained low through October and November in 2015. Influenza A viruses have been most frequently identified, with influenza A (H3) viruses predominating. This report summarizes U.S. influenza activity* for the period October 4–November 28, 2015.†

Viral Surveillance

World Health Organization (WHO) collaborating laboratories and National Respiratory and Enteric Virus Surveillance System (NREVSS) laboratories, which include both public health and clinical laboratories located throughout the United States, participate in virologic surveillance for influenza. Beginning with the 2015–16 influenza season, data for public health and clinical laboratories are presented separately because influenza testing practices differ. Clinical laboratories test respiratory specimens for diagnostic purposes, and data from these laboratories provide useful information regarding the timing and intensity of influenza activity. Public health laboratories primarily test specimens for surveillance purposes to understand which influenza viruses are circulating throughout their jurisdictions and which population groups are being affected. The age group distribution of influenza positive tests reported from public health laboratories is summarized.

Clinical laboratories in the United States tested 102,675 respiratory specimens collected during October 4–November 28, 2015, for influenza viruses. Among these, 1,268 (1.2%) tested positive for influenza (Figure 1); 772 (60.9%) were influenza A viruses, and 496 (39.1%) were influenza B viruses.

Public health laboratories in the United States tested 8,488 respiratory specimens collected during October 4–November 28, 2015, for influenza viruses. Among these, 404 tested positive for influenza (Figure 2); 333 (82.4%) were influenza A viruses, and 71 (17.6%) were influenza B viruses. Of the 333 influenza A viruses, 317 (95.2%) were subtyped; 55 (17.4%) were influenza A(H1N1)pdm09 (pH1N1), and 262 (82.6%) were influenza A (H3) viruses. Of the 71 influenza B viruses, 21 (29.6%) had lineage determined; 13 (61.9%) belonged to the B/Yamagata lineage, and eight (38.1%) belonged to the B/Victoria lineage. Since October 4, influenza-positive test results have been reported from all 50 states, the District of Columbia, Guam, and Puerto Rico, representing all 10 U.S. Department of Health and Human Services (HHS) regions.§ Influenza A viruses have predominated nationally and in all 10 HHS regions.

During October 4–November 28, 2015, age data were available for 370 positive influenza test results, including 31 (8.4%) in children aged 0–4 years, 96 (26.0%) in persons aged 5–24 years, 130 (35.1%) in persons aged 25–64 years, and 113 (30.5%) in persons aged ≥65 years. Influenza A (H3) viruses were predominant in all age groups, accounting for a proportion of influenza positives ranging from 41.9% (ages 0–4 years) to 84.1% (ages ≥65 years). The largest number of influenza A pH1N1 viruses were reported in persons aged 25–64 years. The largest number of influenza B viruses were reported in persons aged 5–24 years and 25–64 years.

Influenza Virus Characterization

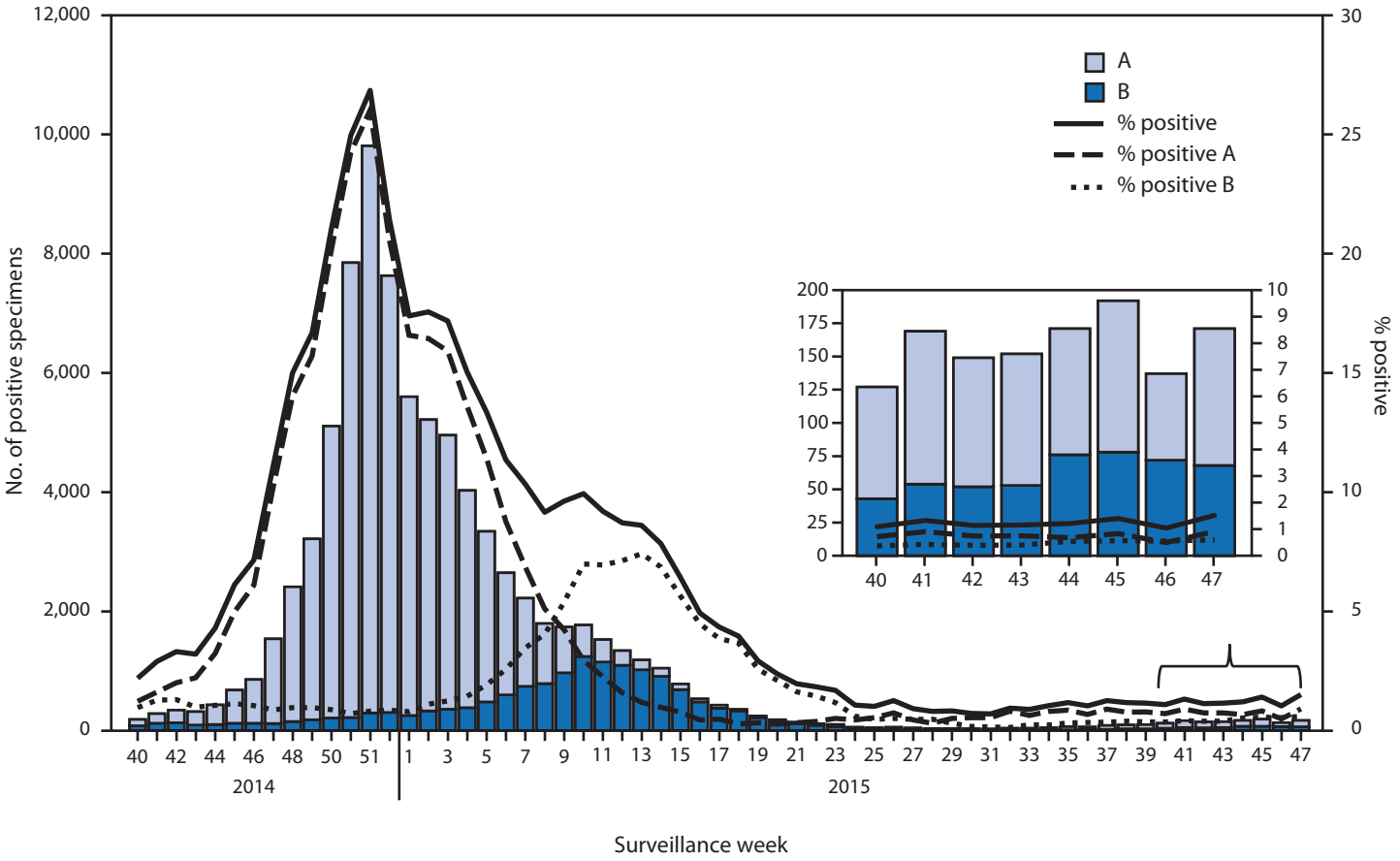
WHO collaborating laboratories in the United States are requested to submit a subset of influenza-positive respiratory specimens to CDC for further virus characterization. CDC characterizes influenza viruses through one or more laboratory tests including genome sequencing, or hemagglutination

* CDC collects five categories of surveillance data from nine data sources: 1) viral surveillance (World Health Organization collaborating laboratories, the National Respiratory and Enteric Virus Surveillance System, and novel influenza A virus case reporting); 2) outpatient illness surveillance (U.S. Outpatient Influenza-Like Illness Surveillance Network); 3) mortality (the National Center for Health Statistics Mortality Surveillance System, 122 Cities Mortality Reporting System, and influenza-associated pediatric mortality reports); 4) hospitalizations (Influenza Hospitalization Surveillance Network [FluSurv-NET], which includes the Emerging Infections Program and surveillance in three additional states); and 5) summary of the geographic spread of influenza (state and territorial epidemiologist reports). Additional information available at http://www.cdc.gov/flu/weekly/fluactivitysurv.htm.

† Data reported as of December 4, 2015.

§ *Region 1:* Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont. *Region 2:* New Jersey, New York, Puerto Rico, and the U.S. Virgin Islands. *Region 3:* Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, and West Virginia. *Region 4:* Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee. *Region 5:* Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin. *Region 6:* Arkansas, Louisiana, New Mexico, Oklahoma, and Texas. *Region 7:* Iowa, Kansas, Missouri, and Nebraska. *Region 8:* Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming. *Region 9:* Arizona, California, Hawaii, Nevada, American Samoa, Commonwealth of the Northern Mariana Islands, Federated States of Micronesia, Guam, Marshall Islands, and Republic of Palau. *Region 10:* Alaska, Idaho, Oregon, and Washington.

FIGURE 1. Number* and percentage of respiratory specimens testing positive for influenza reported by clinical laboratories, by influenza virus type and surveillance week — United States, September 28, 2014–November 28, 2015



* 1,268 of 102,675 tested were positive during October 4–November 28, 2015.

inhibition (HI), or neutralization assays. These data are used to compare how similar currently circulating influenza viruses are to the influenza vaccine reference viruses, and to monitor for changes in circulating influenza viruses. Most viruses tested are propagated in mammalian cell cultures because isolation rates of human influenza viruses are higher in mammalian cell cultures than in eggs. However, egg-propagated vaccine viruses are used widely for production of influenza vaccines because most influenza vaccines are egg-based. Propagation of influenza viruses in eggs can lead to isolation of viruses that differ genetically and antigenically from corresponding clinical specimens isolated in mammalian cell cultures. In addition, mammalian cell-propagated viruses are genetically more representative of viruses present in original clinical specimens (*1*,*2*). Antigenic and genetic characterization of circulating viruses is performed using both mammalian cell- and egg-propagated reference viruses.

Historically HI data have been used most commonly to assess the similarity between reference viruses and circulating viruses. Although vaccine effectiveness field studies must be conducted to actually determine how well the vaccine is working, these laboratory data are used to determine whether changes in the virus have occurred that could affect vaccine effectiveness. Beginning with the 2014–15 season and to date, however, a proportion of influenza A (H3N2) viruses have not yielded sufficient hemagglutination titers for antigenic characterization by HI. For all viruses characterized at CDC laboratories, whole genome sequencing is performed to determine the genetic group identity of these circulating viruses. For the subset of viruses that do not yield sufficient hemagglutination titers, antigenic properties of those viruses are inferred using results from viruses within the same genetic group that have been characterized antigenically.

Since October 1, 2015, CDC has antigenically or genetically characterized 62 specimens (18 influenza A (H1N1)pdm09, 43 influenza A (H3N2), and one influenza B/Yamagata lineage). A total of 43 H3N2 viruses have been genetically sequenced and all 43 viruses belonged to genetic groups for which a majority of antigenically characterized viruses were similar to the cell-propagated reference virus A/Switzerland/9715293/2013 representing the influenza A (H3N2) component of the 2015–16 Northern Hemisphere vaccine. A total of 35 viruses

(18 influenza A (H1N1)pdm09, 16 influenza A (H3N2), and one B/Yamagata lineage) collected since October 1, 2015, have been antigenically characterized. All A(H1N1)pdm09, all B viruses, and 15 of the 16 A(H3N2) viruses were similar to the reference viruses representing the 2015–16 Northern Hemisphere influenza vaccine components.

Antiviral Resistance of Influenza Viruses

The WHO Collaborating Center for Surveillance, Epidemiology, and Control of Influenza at CDC tested 56 influenza virus specimens (11 influenza A (H1N1)pdm09, 33 influenza A (H3N2) and 12 influenza B) collected since October 1, 2015, in the United States for resistance to the influenza neuraminidase inhibitor antiviral medications oseltamivir, zanamivir, and peramivir, which are the drugs currently approved for use against seasonal influenza. All 56 influenza viruses tested were sensitive to all three antiviral medications. High levels of resistance to the adamantanes (amantadine and rimantadine) persist among influenza A (H1N1)pdm09 and (H3N2) viruses. Adamantane drugs are not recommended for use against influenza at this time.

Outpatient Illness Surveillance

Since October 4, the weekly percentage of outpatient visits for influenza-like illness (ILI)[¶] reported by approximately 1,800 U.S. Outpatient ILI Surveillance Network (ILINet) providers in 50 states, New York City, Chicago, the U.S. Virgin Islands, Puerto Rico, and the District of Columbia, has ranged from 1.3% to 1.9% and has remained below the national baseline[**] of 2.1% (Figure 3). Peak weekly percentages of outpatient visits for ILI ranged from 2.4% to 7.6% from the 1997–98 through 2014–15 influenza seasons, excluding the 2009 pandemic. Data collected in ILINet are used to produce a measure of ILI activity[††] by jurisdiction. During surveillance week 47, Puerto Rico and two states (Oklahoma and South Carolina) experienced moderate ILI activity, and four states (Arizona, Mississippi, New Jersey, and Virginia) experienced low ILI activity. Minimal ILI activity was experienced in New York City and 44 states (Alabama, Alaska, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Georgia, Hawaii, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Mexico, New York, North Carolina, North Dakota, Ohio, Oregon, Pennsylvania, Rhode Island, South Dakota, Tennessee, Texas, Utah, Vermont, Washington, West Virginia, Wisconsin, and Wyoming). Data were insufficient to calculate an ILI activity level for the District of Columbia.

Geographic Spread of Influenza Activity

For the week ending November 28 (week 47), Guam reported widespread geographic spread of influenza,[§§] Puerto Rico reported regional spread, and seven states (Iowa, Maryland, Massachusetts, New Hampshire, North Carolina, Oregon, and Utah) reported local spread. The District of Columbia, the U.S. Virgin Islands, and 38 states (Alaska, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Georgia, Hawaii, Idaho, Illinois, Indiana, Kansas, Kentucky, Louisiana, Maine, Michigan, Minnesota, Missouri, Montana, Nebraska, Nevada, New Jersey, New Mexico, New York, North Dakota, Ohio, Oklahoma, Pennsylvania, South Carolina, South Dakota, Texas, Vermont, Washington, West Virginia, Wisconsin, and Wyoming) reported sporadic spread. Five states (Alabama, Mississippi, Rhode Island, Tennessee, and Virginia) reported no influenza activity.

Pneumonia- and Influenza-Associated Mortality

CDC tracks pneumonia and influenza (P&I)–associated deaths through two systems, the National Center for Health Statistics (NCHS) Mortality Surveillance System and the 122 Cities Mortality Reporting System. Beginning during the 2015–16 season, data from the newer NCHS system will be the principal component of the U.S. mortality surveillance system. NCHS mortality data are presented by the week that the death occurred, whereas the 122 Cities Mortality Reporting System data are reported the week that the death certificate

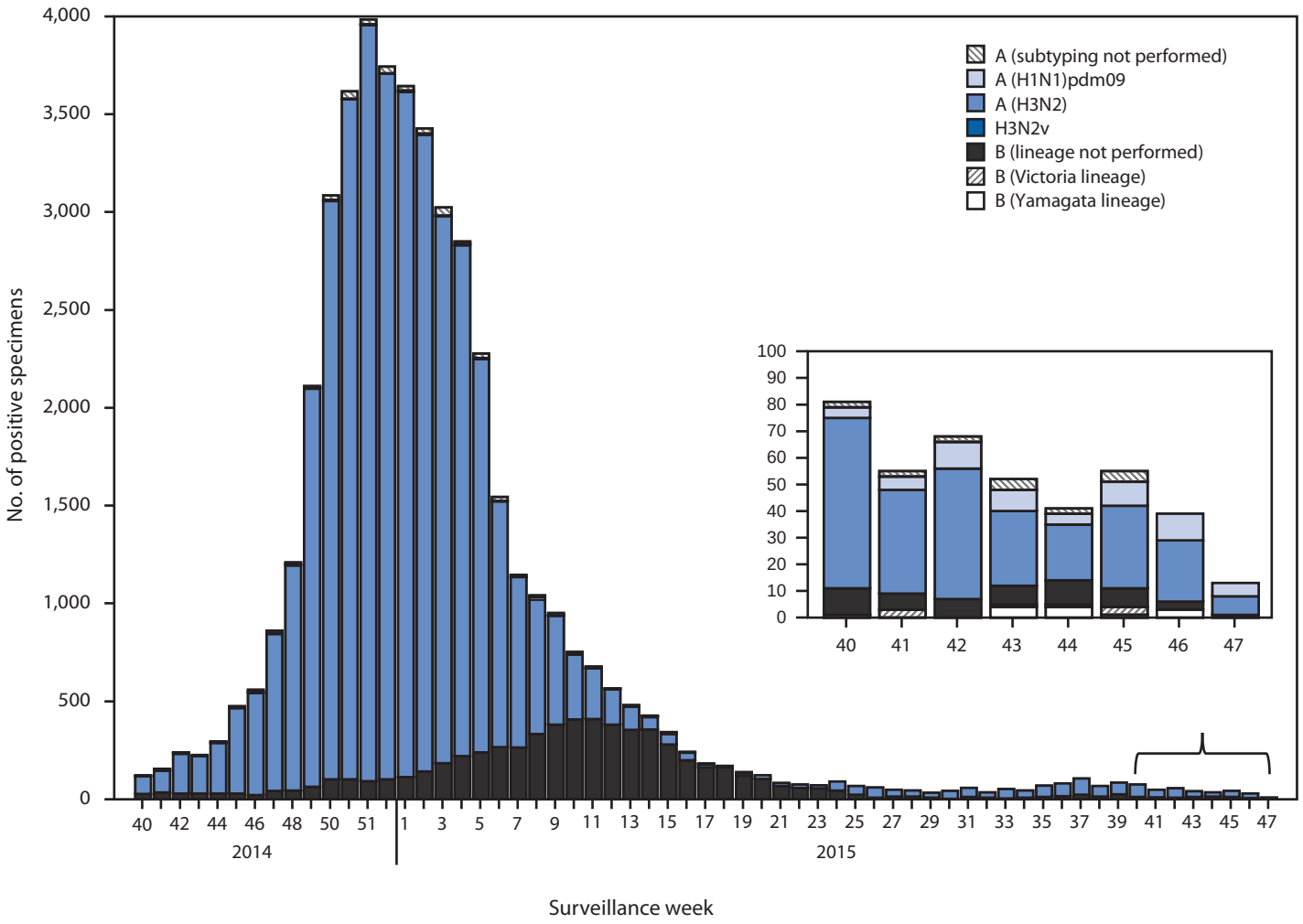
[¶] Defined as a temperature of ≥100°F (≥37.8°C), oral or equivalent, and cough or sore throat, without a known cause other than influenza.

[**] The national and regional baselines are the mean percentage of visits for ILI during noninfluenza weeks for the previous three seasons plus two standard deviations. A noninfluenza week is defined as periods of ≥2 consecutive weeks in which each week accounted for <2% of the season's total number of specimens that tested positive for influenza. National and regional percentages of patient visits for ILI are weighted on the basis of state population. Use of the national baseline for regional data is not appropriate.

[††] Activity levels are based on the percentage of outpatient visits in a jurisdiction attributed to ILI and are compared with the average percentage of ILI visits that occur during weeks with little or no influenza virus circulation. Activity levels range from minimal, corresponding to ILI activity from outpatient clinics at or below the average, to high, corresponding to ILI activity from outpatient clinics much higher than the average. Because the clinical definition of ILI is very nonspecific, not all ILI is caused by influenza; however, when combined with laboratory data, the information on ILI activity provides a clearer picture of influenza activity in the United States.

[§§] Levels of activity are 1) no activity; 2) sporadic: isolated laboratory-confirmed influenza case(s) or a laboratory-confirmed outbreak in one institution, with no increase in activity; 3) local: increased ILI, or at least two institutional outbreaks (ILI or laboratory-confirmed influenza) in one region of the state, with recent laboratory evidence of influenza in that region and virus activity no greater than sporadic in other regions; 4) regional: increased ILI activity or institutional outbreaks (ILI or laboratory-confirmed influenza) in at least two but less than half of the regions in the state with recent laboratory evidence of influenza in those regions; and 5) widespread: increased ILI activity or institutional outbreaks (ILI or laboratory-confirmed influenza) in at least half the regions in the state, with recent laboratory evidence of influenza in the state.

FIGURE 2. Number* of respiratory specimens testing positive for influenza reported by public health laboratories, by influenza virus type, subtype and surveillance week — United States, September 28, 2014–November 28, 2015



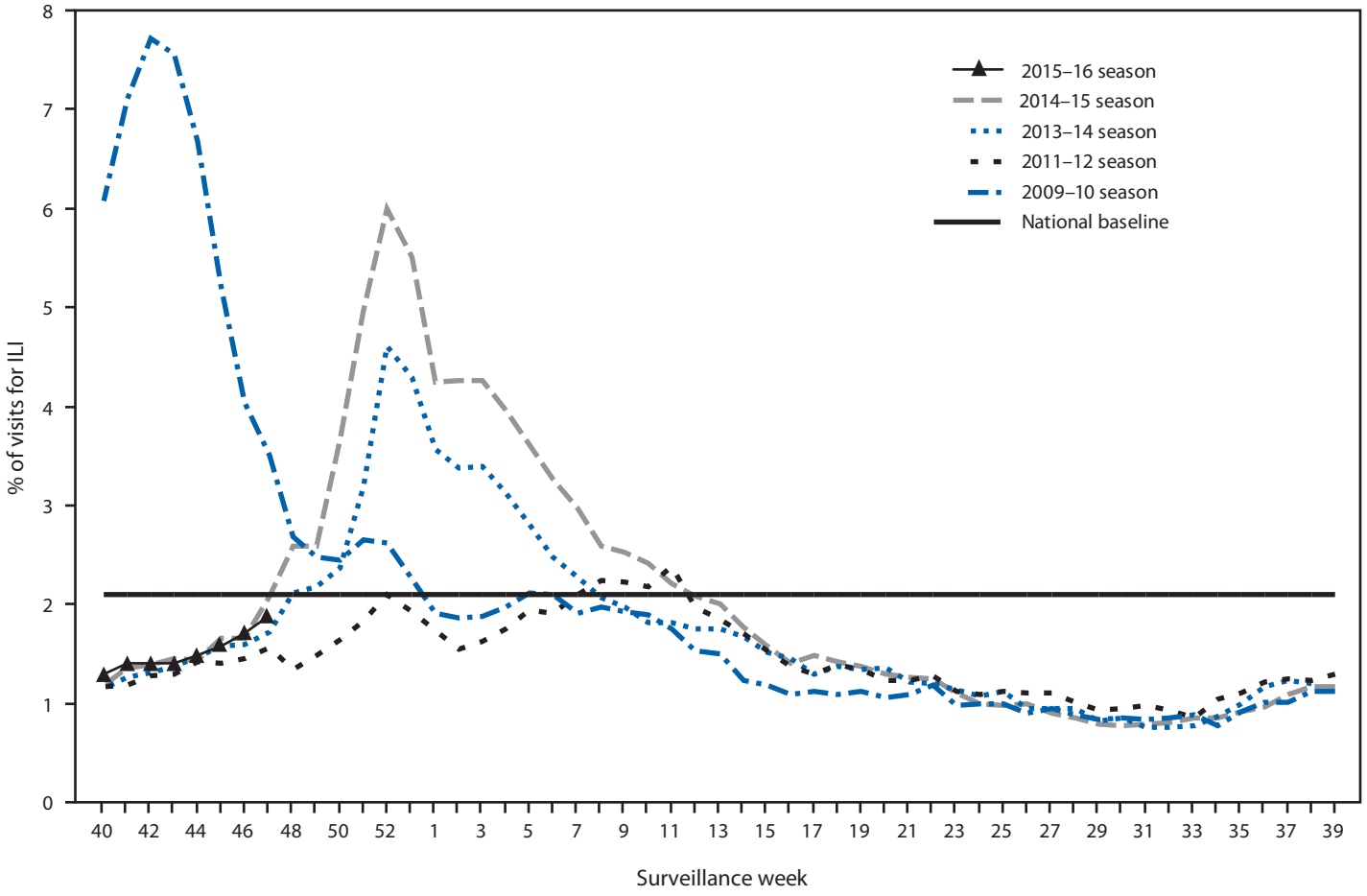
* 404 of 8,488 tested were positive during October 4–November 28, 2015.

was registered. The length of time from the occurrence of a death until registration of the death certificate in the vital statistics office can vary considerably; therefore, these two data sources produce different percentages. Presenting data by the week of the death, rather than the date of filing of the death certificate more accurately reflects the timing of P&I mortality. The percentage of P&I deaths from each system should be compared with the corresponding system-specific baselines and thresholds.

Through the NCHS Mortality Surveillance System, the percentages of deaths associated with P&I are released 2 weeks after the week of death to allow for collection of sufficient data to produce a stable P&I mortality percentage. Based on NCHS data available December 3, 5.9% (1,370 of 23,191) of all U.S. deaths occurring during the week ending November 14, 2015 (week 45) were classified as resulting from P&I. This percentage is below the epidemic threshold[¶¶] of 6.8% for week 45. Since October 4, the weekly percentage of deaths attributed to P&I ranged from 5.9% to 6.2% and has not exceeded the epidemic threshold this season. Peak weekly percentages of deaths attributable to P&I during the previous five influenza seasons ranged from 8.7% during the 2011–12 season to 11.1% during the 2012–13 season.

[¶¶] The seasonal baseline proportion of P&I deaths is projected using a robust regression procedure, in which a periodic regression model is applied to the observed percentage of deaths from P&I that were reported by the National Center for Health Statistics Mortality Surveillance System and the 122 Cities Mortality Reporting System during the preceding 5 years. The epidemic threshold is set at 1.645 standard deviations above the seasonal baseline. Users of the data should not expect the NCHS mortality surveillance data and the 122 Cities Mortality Reporting System to produce the same percentages and the percent P&I deaths from each system should be compared to the corresponding system specific baselines and thresholds.

FIGURE 3. Percentage of all outpatient visits for influenza-like illness (ILI)* reported to CDC, by surveillance week — Outpatient Influenza-like Illness Surveillance Network, United States, October 4–November 28, 2015, and selected previous influenza seasons



* Defined as a fever (≥100°F [≥37.8°C]), oral or equivalent, and cough or sore throat, without a known cause other than influenza.

During the week ending November 28 (week 47), P&I was reported as an underlying or contributing cause of 6.1% (524 of 8,634) of all deaths reported to the 122 Cities Mortality Reporting System. This percentage is below the epidemic threshold of 6.5% for the week. Since October 4, the weekly percentage of deaths attributed to P&I ranged from 5.2% to 6.1% and has not exceeded the epidemic threshold so far this season. Peak weekly percentages of deaths attributable to P&I in the previous five seasons ranged from 7.8% during the 2011–12 season to 9.9% during the 2012–13 season.

Influenza-Associated Pediatric Mortality

As of November 28 (week 47), two influenza-associated pediatric deaths have been reported to CDC during the 2015–16 influenza season, both of which occurred during week 44 (the week ending November 7, 2015). One death was associated with an influenza A virus for which no subtyping was performed, and one death was associated with an influenza B virus. The number of influenza-associated pediatric deaths reported to CDC in the previous three seasons ranged from 111 during the 2013–14 season to 171 during the 2012–13 season. During the 2009 pandemic, 358 pediatric deaths were reported from April 15, 2009, through October 2, 2010 (historically, influenza seasons include data from October [week 40] through September [week 39] of the following year).

Discussion

Influenza activity in the United States for the 2015–16 season remained low during October 4–November 28, 2015. Although the timing of influenza activity can vary, peak activity in the United States most commonly occurs during December–March; however, substantial influenza activity can be observed in November and activity can last as late as May. During the 2014–15 influenza season, activity increased in November and peaked in December; however during the current 2015–16 season, activity remains low. During October 4–November 28,

2015, influenza A (H3N2) viruses were identified most frequently in the United States, but pH1N1 and influenza B viruses also were reported.

Antigenic and genetic characterization of influenza-positive respiratory specimens submitted to CDC indicate that the majority of influenza virus isolates recently examined in the United States are similar to the 2015–16 influenza vaccine reference viruses. Although antigenic and genetic characterization of circulating influenza viruses can indicate whether antigenically different (i.e., "drifted") viruses have emerged, vaccine effectiveness studies are needed to determine how much protection has been provided to the community by vaccination. Last season, laboratory data indicated that most influenza A (H3N2) viruses had drifted from the 2014–15 influenza A (H3N2) vaccine reference virus. During that season, reduced vaccine effectiveness against the predominant influenza A (H3N2) viruses was noted (*3*). During other seasons, however, antigenic differences between circulating and reference vaccine viruses that suggested reduced vaccine effectiveness were not shown to have resulted in reduced protection in community studies undertaken during the season (*3–5*). Predicting which influenza viruses will predominate during a season is challenging. Although no significant drift has been identified in influenza viruses circulating recently, it is possible that drift may still occur.

Vaccination remains the most effective method of preventing influenza and its complications. Even during seasons when vaccine effectiveness is reduced, substantial public health impact can still be observed (*6*). CDC previously developed a model to estimate the illnesses and hospitalizations averted by influenza vaccination in the United States. During 2010–2014, annual vaccination prevented an estimated 1.7–7.8 million cases and 34,000–114,000 hospitalizations per season, or 9.4%–22.3% of hospitalizations associated with influenza (*6*). For the 2014–15 influenza season, updated estimates of vaccination coverage, vaccine effectiveness, and rates of influenza were used in the same model to estimate that influenza vaccination resulted in an estimated 1.9 million (95% confidence interval [CI] = 707,000–4.4 million) fewer illnesses, 966,000 (CI = 344,000–2.2 million) fewer medically attended illnesses, and 67,000 (CI = 15,000–208,000) fewer hospitalizations associated with influenza (*6*).

As of December 4, 2015, vaccine manufacturers have reported that approximately 140 million doses of influenza vaccine have been distributed. Health care providers should offer vaccine to all unvaccinated persons aged ≥6 months now and throughout the influenza season as long as influenza viruses are circulating. Vaccination coverage typically declines markedly after November, prompting CDC to annually observe a National Influenza Vaccination Week (December 6–12 this year) to promote influenza vaccination beyond November. Although the timing of influenza activity can vary, little influenza activity has occurred to date this season; thus, vaccination at this time should still offer substantial public health benefit. Past and current vaccine coverage estimates highlight low influenza vaccination coverage in the United States, despite a universal vaccination recommendation that has been in place since 2010. For the 2015–16 season, the Advisory Committee on Immunization Practices (ACIP) recommends that healthy children aged 2 years through 8 years who have no vaccine contraindications or precautions receive either live attenuated influenza vaccine (LAIV) or inactivated influenza vaccine (IIV), with no preference expressed for either vaccine when one is otherwise appropriate and available (*5*). For the 2015–16 season, ACIP recommends that children aged 6 months through 8 years who have previously received ≥2 total doses of trivalent or quadrivalent influenza vaccine at any time before July 1, 2015, require only 1 dose of 2015–16 influenza vaccine (*5*). The 2 previous doses do not need to have been given during the same or consecutive seasons (*5*). Children in this age group who are being vaccinated for the first time or who have not previously received a total of ≥2 doses before July 1, 2015, require 2 doses of 2015–16 influenza vaccine, administered ≥4 weeks apart (*7*).

Although influenza vaccination is the first and best way to prevent influenza, antiviral medications continue to be an important adjunct to vaccination for reducing the health impact of influenza. Treatment is most effective when given early during illness, and providers should not delay treatment until test results become available or rely on insensitive assays such as rapid antigen detection influenza diagnostic tests to determine treatment decisions (*8*). Treatment with influenza antiviral medications as early as possible is recommended for patients with confirmed or suspected influenza (either seasonal influenza or novel influenza virus infection) who have severe, complicated, or progressive illness; who require hospitalization; or who are at high risk for serious influenza-related complications*** (*8*). Antiviral treatment should not be withheld from severely ill patients or those at high risk with suspected influenza infection pending confirmatory influenza test results or based on illness onset††† (*8*).

*** Persons at higher risk include 1) children aged <2 years; 2) adults aged ≥65 years; 3) persons with chronic pulmonary conditions (including asthma); cardiovascular disease (except hypertension alone); renal, hepatic, hematologic (including sickle cell) disease; metabolic disorders (including diabetes mellitus); or neurologic and neurodevelopmental conditions (including disorders of the brain, spinal cord, peripheral nerves, and muscles, such as cerebral palsy, epilepsy [seizure disorders], stroke, intellectual disability [mental retardation], moderate to severe developmental delay, muscular dystrophy, or spinal cord injury); 4) persons with immunosuppression, including that caused by medications or by human immunodeficiency virus infection; 5) women who are pregnant or postpartum (within 2 weeks after delivery); 6) persons aged ≤18 years who are receiving long-term aspirin therapy; 7) American Indians/Alaska Natives; 8) persons who are morbidly obese (i.e., body mass index ≥40); and 9) residents of nursing homes and other chronic care facilities.

††† Additional information on antiviral use and treatment of influenza is available at: http://www.cdc.gov/flu/antivirals.

Summary

What is already known on this topic?

CDC collects, compiles, and analyzes data on influenza activity year-round in the United States. The influenza season generally begins in the fall and continues through the winter and spring months; however, the timing and severity of circulating influenza viruses can vary by geographic location and season.

What is added by this report?

During October 4–November 28, 2015, influenza activity overall in the United States remained low. Influenza A (H3N2) viruses were the most frequently identified viruses. All viruses characterized thus far this season have been similar to their respective components of the 2015–16 Northern Hemisphere trivalent and quadrivalent influenza vaccines. All influenza viruses tested to date have been sensitive to the antiviral drugs oseltamivir, zanamivir, and peramivir.

What are the implications for public health practice?

Vaccination remains the most effective method to prevent influenza and its complications. Health care providers should offer vaccine to all unvaccinated persons aged ≥6 months now and throughout the influenza season. As an adjunct to vaccine, treatment with influenza antiviral medications can lessen severity and duration of illness and can reduce severe outcomes of influenza. Antiviral medications work best when administered early in the course of influenza-like illness.

Influenza surveillance reports for the United States are posted online weekly and are available at http://www.cdc.gov/flu/weekly. Additional information regarding influenza viruses, influenza surveillance, influenza vaccine, influenza antiviral medications, and novel influenza A virus infections in humans is available at http://www.cdc.gov/flu.

Acknowledgments

State, county, city, and territorial health departments and public health laboratories; U.S. World Health Organization collaborating laboratories; National Respiratory and Enteric Virus Surveillance System laboratories; U.S. Outpatient Influenza-Like Illness Surveillance Network sites; National Center for Health Statistics, CDC; 122 Cities Mortality Reporting System; World Health Organization FluNet; Angie Foust, Wendy Sessions, Elisabeth Blanchard, Priya Budhathoki, Thomas Rowe, Lizheng Guo, Ewelina Lyszkowicz, Shoshona Le, Malania Wilson, Juliana DaSilva, Alma Trujillo, Michael Hillman, Thomas Stark, Samuel Shepard, Sujatha Seenu, Ha Nguyen, Vasiliy Mishin, Margaret Okomo-Adhiambo, Michelle Adamczyk, Juan De la Cruz, Influenza Division, National Center for Immunization and Respiratory Diseases, CDC.

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References

1. Schild GC, Oxford JS, de Jong JC, Webster RG. Evidence for host-cell selection of influenza virus antigenic variants. Nature 1983;303:706–9.
2. Katz JM, Wang M, Webster RG. Direct sequencing of the HA gene of influenza (H3N2) virus in original clinical samples reveals sequence identity with mammalian cell-grown virus. J Virol 1990;64:1808–11.
3. Flannery B, Clippard J, Zimmerman RK, et al. Early estimates of seasonal influenza vaccine effectiveness—United States, January 2015. MMWR Morb Mortal Wkly Rep 2015;64:10–5.
4. Ohmit SE, Victor JC, Rotthoff JR, et al. Prevention of antigenically drifted influenza by inactivated and live attenuated vaccines. N Engl J Med 2006;355:2513–22.
5. Grohskopf LA, Sokolow LZ, Olsen SJ, Bresee JS, Broder KR, Karron RA. Prevention and control of influenza with vaccines: recommendations of the Advisory Committee on Immunization Practices (ACIP)—United States, 2015–16 influenza season. MMWR Morb Mortal Wkly Rep 2015;64:818–25.
6. CDC. Estimated influenza illnesses and hospitalizations averted by vaccination—United States, 2015–16 influenza season. Atlanta, GA: US Department of Health and Human Services, CDC. Available at http://www.cdc.gov/flu/about/disease/2014-15.htm.
7. Neuzil KM, Jackson LA, Nelson J, et al. Immunogenicity and reactogenicity of 1 versus 2 doses of trivalent inactivated influenza vaccine in vaccine-naive 5–8-year-old children. J Infect Dis 2006;194:1032–9.
8. Fiore AE, Fry A, Shay D, Gubareva L, Bresee JS, Uyeki TM. Antiviral agents for the treatment and chemoprophylaxis of influenza—recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR Recomm Rep 2011;60(No. RR-1).

Notes from the Field

Concurrent Outbreaks of St. Louis Encephalitis Virus and West Nile Virus Disease — Arizona, 2015

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St. Louis encephalitis virus (SLEV) and West Nile virus (WNV) are closely related mosquito-borne flaviviruses that can cause outbreaks of acute febrile illness and neurologic disease. Both viruses are endemic throughout much of the United States and have the same *Culex* species mosquito vectors and avian hosts (*1*); however, since WNV was first identified in the United States in 1999, SLEV disease incidence has been substantially lower than WNV disease incidence, and no outbreaks involving the two viruses circulating in the same location at the same time have been identified. Currently, there is a commercially available laboratory test for diagnosis of acute WNV infection, but there is no commercially available SLEV test, and all SLEV testing must be performed at public health laboratories. In addition, because antibodies against SLEV and WNV can cross-react on standard diagnostic tests, confirmatory neutralizing antibody testing at public health laboratories is usually required to determine the flavivirus species (*2*). This report describes the first known concurrent outbreaks of SLEV and WNV disease in the United States.

During 2010–2014, 537 WNV disease cases and only one SLEV disease case were reported to the Arizona Department of Health Services. However, during 2015, by the end of July, SLEV infection had been confirmed in seven ill Arizona residents. In addition, the Maricopa County Vector Control Division identified 60 pools of *Culex tarsalis* or *Culex quinquefasciatus* mosquitoes that tested positive for SLEV RNA by reverse transcription polymerase chain reaction, and 97 pools that tested positive for WNV RNA. An investigation was initiated to ascertain the magnitude and describe the epidemiology of the outbreaks. Cases were defined according to national surveillance case definitions (*3*). If the patient had immunoglobulin M antibody against both WNV and SLEV, and insufficient sample or inconclusive results on neutralizing antibody testing, the case was classified as an unspecified flavivirus infection.

As of November 24, 2015, a total of 117 cases of flavivirus disease had been reported to the Arizona Department of Health Services, including 75 WNV, 19 SLEV, and 23 unspecified flavivirus disease cases. Laboratory testing is ongoing, and some cases will likely be reclassified. Among all cases, 103 (88%) occurred from July through September. Eight (53%) of 15 counties reported cases; 45 (60%) WNV and 18 (95%) SLEV disease cases were reported from Maricopa County. Overall, 77 (66%) patients were aged ≥50 years (median = 54 years, range = 21–89 years), and 61 (52%) were male. Seventy-nine (68%) patients had neuroinvasive disease (e.g., meningitis, encephalitis, or acute flaccid paralysis), including 47 (63%) with WNV infection, 17 (89%) with SLEV infection, and 15 (65%) with unspecified flavivirus infection. Among all 117 cases, 86 (74%) patients were hospitalized and five (4%) died.

This is the first known outbreak of concurrent WNV and SLEV disease. Enhanced clinical and laboratory surveillance activities in Arizona will continue through the end of the arboviral transmission season in late November to characterize the outbreak. WNV and SLEV disease cases will be compared to better understand differences in the epidemiology and outcomes of these diseases. Because of the similarity in clinical presentation for WNV and SLEV disease cases, cross reactivity between WNV and SLEV antibodies, and the lack of availability of a commercial SLEV test, SLEV disease cases could be incorrectly diagnosed as WNV disease cases or remain undetected if clinicians only request WNV testing and no confirmatory testing is conducted. Health care providers should consider both WNV and SLEV infections in the differential diagnosis of cases of aseptic meningitis and encephalitis and obtain appropriate cerebrospinal fluid, serum specimens, or both for laboratory testing (*4*). Confirmatory testing at state health departments or CDC will be required to distinguish these flavivirus infections. When feasible, vector control programs should test mosquitoes for SLEV in addition to WNV. Clinical management for both diseases involves supportive care. Because human vaccines against domestic arboviruses are not available, prevention of arboviral infection depends on local vector control, community, and household efforts to reduce vector populations (e.g., removal of standing water), and individual efforts to decrease exposure to mosquitoes (e.g., applying mosquito repellant and eliminating mosquito breeding sites).

*These authors contributed equally to this report.

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References

1. Reimann CA, Hayes EB, DiGuiseppi C, et al. Epidemiology of neuroinvasive arboviral disease in the United States, 1999–2007. Am J Trop Med Hyg 2008;79:974–9.
2. Martin DA, Noga A, Kosoy O, Johnson AJ, Petersen LR, Lanciotti RS. Evaluation of a diagnostic algorithm using immunoglobulin M enzyme-linked immunosorbent assay to differentiate human West Nile virus and St. Louis Encephalitis virus infections during the 2002 West Nile virus epidemic in the United States. Clin Diagn Lab Immunol 2004;11:1130–3.
3. CDC. Arboviral diseases, neuroinvasive and non-neuroinvasive: 2015 case definition. Atlanta, GA: US Department of Health and Human Services, CDC; 2015. Available at http://wwwn.cdc.gov/nndss/conditions/arboviral-diseases-neuroinvasive-and-non-neuroinvasive/case-definition/2015/.
4. CDC. West Nile virus—for healthcare providers: diagnostic testing. Atlanta, GA: US Department of Health and Human Services, CDC; 2015. Available at http://www.cdc.gov/westnile/healthCareProviders/healthCareProviders-Diagnostic.html.

Erratum

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In the *MMWR* report, "Notes from the Field: Carbapenem-resistant Enterobacteriaceae Producing OXA-48-like Carbapenemases — United States, 2010–2015," multiple errors occurred. On page 1315, in the first paragraph of the report, the fifth, sixth, and seventh sentences should read, "The OXA-48 carbapenemase was first identified in Enterobacteriaceae in Turkey in 2001 (***4***), and OXA-48-like variants have subsequently been reported around the world. The first U.S. reports of OXA-48-like carbapenemases were published in 2013 and included retrospectively identified isolates from 2009 (***5***) and two isolates collected in 2012 from patients in Virginia who had recently been hospitalized outside the United States (***6***). Although there are limited additional published reports from the United States (***7***), CDC continues to receive **reports** of these organisms."

On page 1315, in the fourth paragraph of the report, the first and second sentences should read, "CRE producing OXA-48-like carbapenemases have demonstrated the ability to spread in other countries (***8***) and cause outbreaks in health care settings. Factors potentially contributing to the spread of these organisms include the high transfer efficiency of the plasmid containing OXA-48-like genes (***8***) and challenges in identifying these organisms."

On page 1316, the last sentence of the fourth paragraph should read, "The modification of the CDC CRE surveillance definition in January 2015 to include organisms that are resistant to ertapenem or that possess a carbapenemase gene should improve sensitivity for detecting OXA-48-producing CRE (***9***)."

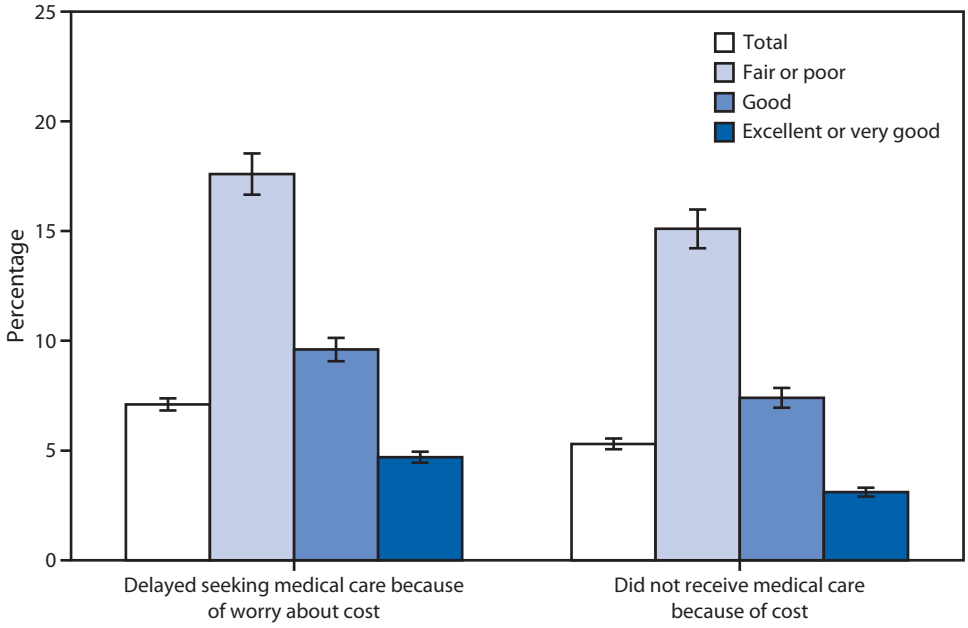
On page 1316, the second sentence of the last paragraph of the report should read, "This is consistent with recommendations in the CDC Health Advisory from February 2013 (***10***), which sought to prevent transmission of isolates producing non-*K. pneumoniae* carbapenemases by improving their detection in patients recently hospitalized outside the United States."

On page 1316, reference 4 should read, "Liu Y, Wang Y, Walsh TR, et al. Emergence of plasmid-mediated colistin resistance mechanism MCR-1 in animals and human beings in China: a microbiological and molecular biological study. Lancet **Infect Dis**. Epub Nov 18, 2015."

QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Percentage of Persons Who Delayed or Did Not Receive Medical Care During the Preceding Year Because of Cost, by Health Status* — National Health Interview Survey,† United States, 2014



* Percentages shown with 95% confidence intervals. Based on responses to the following questions: "During the past 12 months, has [person] delayed seeking medical care because of worry about the cost?" and "During the past 12 months, was there any time when [person] needed medical care, but did not get it because [person] couldn't afford it?" Both questions excluded dental care. Respondents were asked to answer regarding themselves and other family members living in the same household. Health status data were obtained by asking respondents to assess their own health and that of family members living in the same household as excellent, very good, good, fair, or poor.

† 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 Family Core component. Unknowns were excluded from the denominators when calculating percentages.

Based on 2014 data, approximately 7% of persons (22.3 million) in the United States delayed medical care during the preceding year because of worry about the cost, and 5% (16.5 million) did not receive needed medical care because they could not afford it. Persons whose health was assessed as fair or poor were nearly four to five times as likely as persons whose health was excellent or very good to delay care (17.6% versus 4.7%) or not receive needed medical care (15.1% versus 3.1%) because of cost.

Source: National Health Interview Survey, 2014 data. Available at http://www.cdc.gov/nchs/nhis.htm.

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