

Alcohol Use and Binge Drinking Among Women of Childbearing Age — United States, 2006–2010

Alcohol use during pregnancy is a leading preventable cause of birth defects and developmental disabilities. Alcohol-exposed pregnancies (AEPs) can lead to fetal alcohol syndrome and other fetal alcohol spectrum disorders (FASDs), which result in neurodevelopmental deficits and lifelong disability (1). In 2005, the Surgeon General issued an advisory urging women who are pregnant or who might become pregnant to abstain from alcohol use (2). *Healthy People 2020* set specific targets for abstinence from alcohol use (MICH-11.1) and binge drinking (MICH-11.2) for pregnant women (3). To estimate the prevalence of any alcohol use and binge drinking in the past 30 days among women aged 18–44 years, CDC analyzed 2006–2010 Behavioral Risk Factor Surveillance System (BRFSS) data. Based on their self-reports, an estimated 51.5% of nonpregnant women used alcohol, as did 7.6% of pregnant women. The prevalence of binge drinking was 15.0% among nonpregnant women and 1.4% among pregnant women. Among pregnant women, the highest prevalence estimates of reported alcohol use were among those who were aged 35–44 years (14.3%), white (8.3%), college graduates (10.0%), or employed (9.6%). Among binge drinkers, the average frequency and intensity of binge episodes were similar, approximately three times per month and six drinks on an occasion, among those who were pregnant and those who were not. Clinical practices that advise women about the dangers associated with drinking while pregnant, coupled with community-level interventions that reduce alcohol-related harms, are necessary to mitigate AEP risk among women of childbearing age and to achieve the *Healthy People 2020* objectives.

BRFSS is a state-based, random-digit-dialed telephone survey that collects information on health-related behaviors from a representative sample of civilian, noninstitutionalized adults aged ≥ 18 years. CDC aggregated and analyzed BRFSS data for 2006–2010 from all 50 states and the District of Columbia for 345,076 women aged 18–44 years. The median response rate among states, based on Council of American Survey and Research Organizations guidelines, ranged from 50.6% to 54.6%, and the median cooperation rate ranged from 72.1% to 76.9%.* The prevalence of any alcohol use, defined as having at least one drink of any alcoholic beverage in the past 30 days, and binge drinking, defined for women as four or more drinks on an occasion in the past 30 days, among

pregnant and nonpregnant women, were estimated.† Logistic regression was used to examine, separately for pregnant and nonpregnant women, the association of selected demographic characteristics with any alcohol use and with binge drinking. The regression model adjusted for age, race/ethnicity, education, employment, and marital status. The average number of binge episodes in the past 30 days (frequency) and the average maximum number of drinks consumed on an occasion in the past 30 days (intensity) among binge drinkers were estimated with 95% confidence intervals. Because of small sample sizes, binge drinking frequency and intensity estimates for demographic subgroups among pregnant women were unreliable and are not reported. Data were weighted to state population estimates and combined to represent a nationwide estimate. Analyses were conducted using statistical software to account for the complex sampling method used in BRFSS.

The study population of 345,076 women aged 18–44 years included 13,880 (4.0%) pregnant women and 331,196 (96.0%) women who were not pregnant. Prevalence estimates for any alcohol use in the past 30 days during 2006–2010 were 7.6% among pregnant women and 51.5% among nonpregnant women (Table 1). The 2006–2010 prevalence estimates for binge drinking in the past 30 days were 1.4% among pregnant women and 15.0% among nonpregnant women.

Among pregnant women, those aged 35–44 years reported the highest prevalence of any alcohol use (14.3%) (adjusted odds ratio [AOR] = 3.3), compared with women aged 18–24 years (4.5%). Among pregnant women, the odds of reporting binge drinking were nearly two and a half times greater among those who were employed (AOR = 2.4), compared with those who were not employed, and even greater for those who were unmarried (AOR = 3.1), compared with those who were married.

Among nonpregnant women, white women reported the highest prevalence of any alcohol use (58.3%) and binge drinking (17.7%) in the past 30 days, compared with nonpregnant women in any of the other race/ethnicity groups. Compared with their Hispanic counterparts, nonpregnant white women reported higher prevalences of alcohol use (AOR = 1.9) and binge drinking (AOR = 1.8). The prevalence of reported binge drinking among nonpregnant women aged 18–24 years (20.5%) was nearly double that of nonpregnant women aged 35–44 years (11.8%).

*The response rate reflects telephone sampling efficiency and the degree of participation among eligible respondents contacted. The cooperation rate reflects the proportion of persons who completed an interview among eligible persons contacted.

†Pregnancy status was assessed by asking the woman if, to her knowledge, she was currently pregnant. BRFSS questionnaires are available at <http://www.cdc.gov/brfss/questionnaires/questionnaires.htm>.

TABLE 1. Estimated percentages* and adjusted odds ratios of women aged 18–44 years who reported any alcohol use or binge drinking,† by pregnancy status and selected characteristics — Behavioral Risk Factor Surveillance System, United States, 2006–2010

Characteristic	Pregnant (n = 13,880)								Nonpregnant (n = 331,196)							
	Any use				Binge drinking				Any use				Binge drinking			
	%	(95% CI)	AOR [§]	(95% CI)	%	(95% CI)	AOR	(95% CI)	%	(95% CI)	AOR	(95% CI)	%	(95% CI)	AOR	(95% CI)
Total	7.6	(6.9–8.4)	—	—	1.4	(1.1–1.7)	—	—	51.5	(51.2–51.8)	—	—	15.0	(14.8–15.3)	—	—
Age group (yrs)																
18–24	4.5	(3.5–5.8)	1.0	Referent	1.3	(0.7–2.3)	1.0	Referent	48.5	(47.6–49.4)	1.0	Referent	20.5	(19.8–21.3)	1.0	Referent
25–29	6.9	(5.5–8.7)	1.5	(1.0–2.2)	1.3	(0.9–2.1)	1.3	(0.7–2.4)	53.8	(53.0–54.6)	1.1	(1.0–1.1)	18.5	(17.9–19.1)	1.0	(0.9–1.0)
30–34	7.9	(6.7–9.3)	1.7	(1.2–2.5)	1.4	(0.9–2.1)	1.4	(0.7–2.8)	51.6	(50.9–52.3)	0.9	(0.9–1.0)	13.3	(12.9–13.8)	0.7	(0.6–0.7)
35–44	14.3	(12.0–16.8)	3.3	(2.3–4.8)	1.5	(0.9–2.3)	1.5	(0.8–3.0)	52.2	(51.8–52.7)	0.9	(0.9–0.9)	11.8	(11.5–12.0)	0.6	(0.5–0.6)
Race/Ethnicity																
White, non-Hispanic	8.3	(7.4–9.3)	1.2	(0.8–1.8)	1.5	(1.1–2.0)	1.2	(0.6–2.5)	58.3	(58.0–58.7)	1.9	(1.9–2.0)	17.7	(17.4–18.0)	1.8	(1.7–1.9)
Black, non-Hispanic	7.3	(5.4–9.7)	1.0	(0.6–1.6)	0.7	(0.4–1.3)	0.4	(0.2–0.9)	43.9	(43.0–44.9)	1.1	(1.0–1.2)	9.8	(9.3–10.5)	0.8	(0.7–0.9)
Hispanic	5.7	(4.2–7.6)	1.0	Referent	1.4	(0.9–2.2)	1.0	Referent	35.7	(34.8–36.6)	1.0	Referent	10.3	(9.7–10.9)	1.0	Referent
Other	8.1	(5.5–11.6)	1.2	(0.7–2.0)	1.3	(0.5–2.9)	1.0	(0.4–2.8)	43.4	(42.0–44.7)	1.0	(0.9–1.1)	12.1	(11.2–13.1)	1.1	(1.0–1.2)
Education																
High school diploma or less	5.0	(4.0–6.2)	1.0	Referent	1.4	(0.9–2.2)	1.0	Referent	37.0	(36.4–37.6)	1.0	Referent	12.5	(12.1–12.9)	1.0	Referent
Some college	7.7	(6.3–9.4)	1.4	(1.0–2.0)	1.3	(0.9–2.1)	1.0	(0.5–1.8)	53.4	(52.8–54.0)	1.7	(1.7–1.8)	16.6	(16.1–17.0)	1.3	(1.2–1.3)
College degree	10.0	(8.7–11.3)	1.6	(1.1–2.4)	1.4	(1.0–1.9)	1.0	(0.5–1.9)	64.6	(64.1–65.1)	2.7	(2.6–2.7)	16.3	(15.9–16.7)	1.4	(1.3–1.5)
Employed																
Yes	9.6	(8.5–10.8)	1.6	(1.2–2.0)	1.8	(1.4–2.3)	2.4	(1.3–4.5)	57.9	(57.5–58.3)	1.7	(1.6–1.7)	16.7	(16.4–17.0)	1.5	(1.4–1.5)
No	5.2	(4.3–6.3)	1.0	Referent	0.8	(0.5–1.5)	1.0	Referent	41.3	(40.8–41.9)	1.0	Referent	12.4	(12.0–12.8)	1.0	Referent
Married																
Yes	7.6	(6.7–8.5)	1.0	Referent	1.0	(0.8–1.4)	1.0	Referent	52.3	(51.9–52.7)	1.0	Referent	12.0	(11.8–12.3)	1.0	Referent
No	7.6	(6.3–9.1)	1.8	(1.4–2.5)	2.1	(1.4–3.1)	3.1	(1.8–5.6)	50.6	(50.1–51.2)	1.2	(1.1–1.2)	18.9	(18.5–19.3)	1.7	(1.6–1.7)

Abbreviations: CI = confidence interval; AOR = adjusted odds ratio.

* Percentages weighted to represent the U.S. population.

† Defined as having consumed four or more drinks on an occasion at least one time in the past 30 days.

§ Model includes age, race/ethnicity, education, employment, and marital status.

Among pregnant and nonpregnant women who reported binge drinking, the estimated average frequency and intensity of binge drinking were similar, approximately three times per month and six drinks on an occasion (Figure). Among age groups of nonpregnant women, average frequency and intensity of binge episodes were highest among women aged 18–24 years (3.3 times per month and 6.7 drinks on an occasion) (Table 2). The frequency and intensity of binge drinking episodes decreased with increasing education. On average, women with a high school diploma or less reported binge drinking 3.4 times per month and 6.4 drinks on an occasion, compared with 2.5 times per month and 5.4 drinks on an occasion among college graduates. Frequency and intensity of binge drinking episodes also were greater among unmarried women (3.3 times per month and 6.4 drinks on an occasion), compared with married women (2.6 times per month and 5.4 drinks on an occasion).

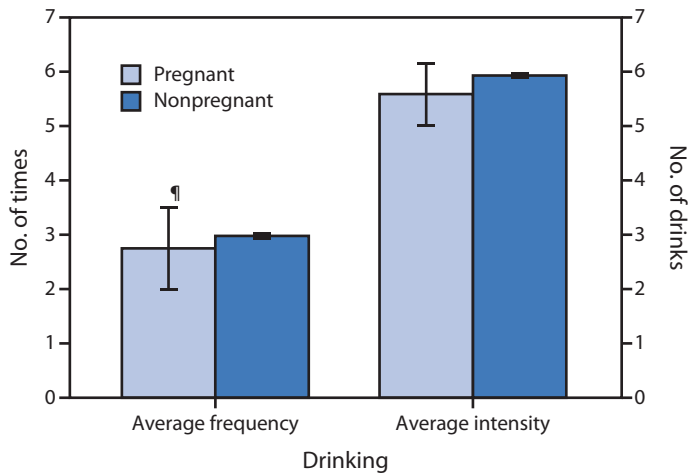
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Editorial Note

FASDs, which include fetal alcohol syndrome, alcohol-related birth defects, and alcohol-related neurodevelopmental disorder, are estimated to affect at least 1% of all births in the United States (4). FASDs have been associated with alcohol consumption patterns that produce high blood alcohol concentrations, such as binge drinking (5). Animal studies have found that binge-like drinking patterns are particularly dangerous, especially to fetal brain development, even if the total amount

FIGURE. Estimated average frequency* and intensity† of binge drinking‡ among women of childbearing age who reported binge drinking in the past 30 days — Behavioral Risk Factor Surveillance System, United States, 2006–2010



* Number of times respondent reported consuming four or more drinks on an occasion in the past 30 days.

† Largest number of drinks consumed on an occasion in the past 30 days.

‡ Defined as having consumed four or more drinks on an occasion at least one time in the past 30 days.

¶ 95% confidence interval.

of alcohol consumed is less than that consumed in a more continuous drinking pattern (5). Although the prevalence of binge drinking is much lower among pregnant women than among nonpregnant women (1.4% versus 15.0%), those who did report binge drinking in the past 30 days did so with similar frequency (average of approximately three times a month) and similar intensity (average of approximately six drinks on an occasion) to nonpregnant women. These frequency and intensity estimates for pregnant and nonpregnant women of childbearing age are similar to the findings previously reported for all adult women (6).

Women who binge drink in the preconception period are more likely than non-binge drinkers to continue drinking, even after becoming pregnant (1). Among nonpregnant binge drinkers, binge drinking prevalence, frequency, and intensity were highest among those aged 18–24 years. Alcohol screening and brief interventions (SBI) among nonpregnant women, which include short counseling sessions, feedback, advice, and goal-setting conducted by health-care providers, might be helpful for reducing alcohol misuse§ among women at risk for an AEP (7).

§ According to the U.S. Preventive Services Task Force, alcohol misuse includes consumption of more than seven drinks per week or more than three drinks per occasion for women and any alcohol consumption during pregnancy.

TABLE 2. Estimated average frequency* and intensity† of binge drinking‡ among nonpregnant women of childbearing age who reported binge drinking in the past 30 days, by selected characteristics — Behavioral Risk Factor Surveillance System, United States, 2006–2010

Characteristic	Frequency			Intensity		
	No.¶	Mean**	(95% CI)	No.	Mean	(95% CI)
Total	47,900	3.0	(2.9–3.0)	45,352	5.9	(5.9–6.0)
Age group (yrs)						
18–24	6,982	3.3	(3.1–3.4)	6,481	6.7	(6.5–6.8)
25–29	8,657	2.9	(2.7–3.1)	8,205	6.1	(5.9–6.2)
30–34	9,478	2.7	(2.6–2.8)	9,005	5.7	(5.6–5.8)
35–44	22,783	2.9	(2.8–3.0)	21,661	5.3	(5.3–5.4)
Race/Ethnicity						
White, non-Hispanic	37,653	3.0	(2.9–3.1)	35,839	6.0	(5.9–6.0)
Black, non-hispanic	3,217	3.4	(3.0–3.7)	2,964	5.3	(5.1–5.6)
Hispanic	3,700	2.7	(2.5–2.9)	3,457	5.7	(5.5–5.9)
Other	3,136	3.1	(2.8–3.4)	2,917	6.4	(6.0–6.7)
Education						
High school diploma or less	14,052	3.4	(3.3–3.5)	13,001	6.4	(6.3–6.6)
Some college	14,771	3.2	(3.0–3.3)	13,958	6.1	(6.0–6.2)
College degree	19,057	2.5	(2.4–2.6)	18,380	5.4	(5.3–5.5)
Employed						
Yes	35,660	2.9	(2.8–3.0)	33,892	5.8	(5.8–5.9)
No	12,182	3.2	(3.0–3.3)	11,408	6.1	(6.0–6.3)
Married						
Yes	23,559	2.6	(2.5–2.6)	22,553	5.4	(5.3–5.4)
No	24,265	3.3	(3.2–3.4)	22,734	6.4	(6.3–6.5)

Abbreviation: CI = confidence interval.

* Number of times respondent reported consuming four or more drinks on an occasion in the past 30 days.

† Largest number of drinks consumed on an occasion in the past 30 days.

‡ Defined as having consumed four or more drinks on an occasion at least one time in the past 30 days.

¶ Unweighted sample size for nonpregnant binge drinkers.

** Weighted mean.

What is already known on this topic?

Alcohol misuse is associated with fetal alcohol spectrum disorders (FASDs), miscarriage, motor vehicle crashes, intimate partner violence, and other adverse outcomes. Alcohol use during pregnancy is a leading preventable cause of birth defects and developmental disabilities. FASDs are estimated to affect at least 1% of all births in the United States. There is no known safe level of alcohol consumption during pregnancy and binge drinking is a high-risk pattern of alcohol consumption.

What is added by this report?

Based on 2006–2010 data from the Behavioral Risk Factor Surveillance System, among nonpregnant women aged 18–44 years, 51.5% used alcohol in the past 30 days, as did 7.6% of pregnant women of the same age. The prevalence of binge drinking in the past 30 days was estimated to be 15.0% among nonpregnant women and 1.4% among pregnant women. Among binge drinkers, pregnant and nonpregnant women drank with similar frequency and intensity.

What are the implications for public health practice?

Alcohol consumption (any use and binge drinking) among pregnant women is a public health concern. Public health interventions, such as alcohol screening and brief interventions and community-level policy interventions (e.g., increasing alcohol excise taxes and limiting alcohol outlet density) can help reduce alcohol misuse by pregnant and nonpregnant women of childbearing age.

For 2001–2005, CDC previously estimated binge drinking at 1.8% among pregnant women and 12.6% among nonpregnant women (8). For the 2006–2010 period, estimated binge drinking among pregnant women was lower (1.4%), but higher among nonpregnant women (15.0%). Until 2004, binge drinking was defined for men and women as five or more drinks on an occasion. In 2004, the National Institute on Alcohol Abuse and Alcoholism changed the definition of binge drinking for women to four or more drinks on an occasion to account for physiologic differences between men and women that affect the absorption of alcohol. BRFSS adopted the new sex-specific definition in 2006 (9). This definition change sets a lower threshold for binge drinking among women, and therefore has the effect of increasing the prevalence estimate (9). A possible reason this increase is not observed in the pregnant population for the 2006–2010 data might be a change in the BRFSS questionnaire. Beginning in 2006, pregnancy status was asked before the alcohol consumption questions; the order was reversed in earlier questionnaires. Women who already have disclosed that they are pregnant might be less likely to report alcohol use in the past 30 days. Regardless of the binge drinking definition change and questionnaire change, these results indicate that binge drinking during pregnancy continues to be a concern.

The findings in this report are subject to at least three limitations. First, BRFSS data are self-reported and subject to misclassification, recall, and social desirability biases, which can lead to underestimates of alcohol consumption. Second, the prevalence of households without landline telephones and only cellular telephones is increasing, which excludes persons from landline-only surveys such as BRFSS who only use cellular telephones and might be more likely to consume alcohol and binge drink. BRFSS will include data for respondents with cellular telephones beginning with the 2011 data set. Finally, BRFSS also does not collect information from persons living in institutional settings (e.g., on college campuses), and so data might not be representative of those populations.

Pregnant and nonpregnant women of childbearing age who misuse alcohol might benefit from public health interventions. SBI and community level policy interventions, such as increased alcohol excise taxes and limiting alcohol outlet density[§] might be effective in reducing alcohol misuse among women and help to achieve the *Healthy People 2020* goals of 98.3% abstinence from any alcohol use and 100% abstinence from binge drinking among pregnant females aged 15–44 years. Alcohol SBI is an evidence-based approach to address alcohol misuse in adults, including pregnant women, that has been recommended by the U.S. Preventive Services Task Force (7). CDC currently supports FASD Regional Training Centers to provide training to medical and allied health students, residents, and practitioners regarding prevention, identification, and management of FASDs. This includes teaching how to screen and intervene with women at risk for an AEP. CDC also is developing a guide for implementing SBI in primary-care settings and promoting public health efforts based on adaptations of Project CHOICES (Changing High-Risk Alcohol Use and Improving Contraception Effectiveness Study), an effective intervention that uses motivational interviewing to aid women of reproductive age in reducing their risk for an AEP (10). Widespread adoption of SBI in primary care settings, including obstetricians' offices, and community interventions might help reduce FASDs and other adverse pregnancy outcomes.

[§]These community interventions are recommended by the Task Force for Community Preventive Services. Additional information available at <http://www.thecommunityguide.org/alcohol/index.html>.

Acknowledgments

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