Combined Tobacco and Alcohol Use by Pregnant and Reproductive-aged Women in the United States

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Objective: To assess trends in the concurrent use of alcohol and tobacco among pregnant women.

Methods: Using behavioral risk factor surveillance system data from 1987 through 1997, we determined the prevalence of concurrent tobacco and alcohol use among women aged 18–44 years by pregnancy status and indirectly estimated pregnancy-related disuse rates.

Results: The percentage of women who used alcohol and tobacco decreased significantly from 1987 to 1990 among pregnant (5.4% to 3.0%) and nonpregnant women (17.6% to 14.2%), but thereafter did not change significantly. The estimated pregnancy-related disuse rate of tobacco and alcohol increased insignificantly from 70% in 1987 to 82% in 1997. Among women who used both substances, pregnancy-related disuse was slightly greater for alcohol alone (74%) than for tobacco alone (52%). There was not a significant decline in concurrent use of tobacco and alcohol between 1987 and 1997 among women 18–20 years old (pregnant, 4.4% to 3.6%; nonpregnant, 13.5% to 13.7%). That age group also showed a smaller pregnancy-related disuse rate than older women (1997, 74% versus 83%).

Conclusion: The steady trend in concurrent use of tobacco and alcohol by young women emphasizes the need for enhanced efforts to reduce the initiation of tobacco and alcohol use by young people. Women who report abuse of tobacco or alcohol should be evaluated for abuse of both substances, and interventions should address abuse of both substances. (Obstet Gynecol 2000;96:767–71.)

The public health implications of alcohol use or tobacco smoking are compounded for women because of adverse outcomes related to pregnancy and other reproductive health issues and because of the effect that adults’ use of tobacco or alcohol has on their children’s health.1–4 Adverse effects, including infertility, preterm birth, and spontaneous abortions, can be caused by tobacco or alcohol, and they might cause some effects synergistically.1–4 Smoking and alcohol use cluster in similar population subgroups, and the use of one product increases the risk of use of the other.5

In the United States during the 1980s, the prevalence of smoking and alcohol consumption declined.6 However, in the 1990s, the prevalence of smoking increased among adolescents and young adults.7 Among women of childbearing age, the prevalence of smoking decreased from 27% in 1987 to 24% in 1991 and varied little thereafter.8 The prevalence of alcohol consumption in women of childbearing age also decreased from 56% in 1988 to 51% in 1992, then varied little thereafter.9 We assessed national trends in pregnancy-related differences in concurrent use of tobacco and alcohol among women of reproductive age, with an emphasis on pregnant women. We used data from a population-based survey10 from 33 states that represented all of the major United States geographic regions and contained about three fourths of the United States population.11

Materials and Methods

The behavioral risk factor surveillance system is an ongoing, state-based, telephone survey of the institutionalized civilian population aged 18 years or older, which gathers information about risk factors related primarily to chronic diseases. A full description of the behavioral risk factor surveillance system and a list of the questions asked in that survey on smoking, alcohol use, and pregnancy status have been published.8–10 Questions on use of illicit drugs are not asked. During the study period, the median response rate (ratio of completed interviews to the sum of completed interviews and refusals) ranged from 80–85%. The sociodemographic characteristics of the survey respondents are
comparable with those of the population in the 33 states combined.11

We restricted our analysis to data from 33 states that collected information on smoking and alcohol consumption consistently throughout the study period. In the behavioral risk factor surveillance system,8–10 information on smoking was collected each year, whereas information on alcohol consumption was collected each year from 1987 through 1993 and once every 2 years thereafter. We limited our analysis to women aged 18–44 years. We combined responses to questions on smoking and alcohol consumption to obtain the prevalence of concurrent use. From the total sample we collected percentages of pregnant and nonpregnant women who reported using tobacco and alcohol. We do not have information on each woman’s smoking or alcohol consumption habits before and after she realized she was pregnant, so we indirectly estimated8,9 pregnancy-related disuse rates for concurrent use from the prevalence rate ratio, using the formula: 1 − (% pregnant ÷ % nonpregnant). We converted disuse rates to percentages and assumed that pregnancy-related disuse rates reflected quit rates. For example, if 25% of nonpregnant women and 15% of pregnant women were smokers, the prevalence rate ratio would be 0.6 (ie, 15 ÷ 25 = 0.6), meaning that 60% of women continued to smoke after becoming pregnant or 40% ([1.0 − 0.6] × 100 = 40%) quit after becoming pregnant.

We also determined the percentage of concurrent users of tobacco and alcohol among women who were smokers or alcohol users. The current dietary recommendation for alcohol in the United States for women is to not exceed one drink per day,12 so we also assessed the percentage of women who smoked and had more than one drink per day (at least eight drinks a week), and the percentage of women who were smokers and binge drinkers (at least five drinks on one occasion). Respondents aged 18–20 years were combined in one category to assess young adults’ use of tobacco and alcohol.13 We weighted the state-specific data to reflect the overall population distribution of the 33 states. Using direct standardization, we adjusted the overall prevalence rates of concurrent use of tobacco and alcohol to the age distribution of pregnant women in the 1987 sample. Standard errors and 95% confidence intervals (CIs) were estimated using the software for survey data analysis (SUDAAN; Research Triangle Institute, Research Triangle Park, NC). We created least-squares linear regression models (using the inverse of the variance estimates for weights) to determine statistical significance of the linear trends in prevalence rates. We created logistic regression models for interaction between calendar year and pregnancy status to determine statistical significance of the variation over time in pregnancy-related disuse rates. $P < .05$ was considered statistically significant. Most outcome measures showed a linear relationship with calendar year or no significant secular variation, so the results of the stratified analyses were reported only for the beginning and ending years.

**Results**

Among the 33 states, 190,850 women aged 18–44 years responded to the survey from 1987 through 1993, in 1995, and in 1997. We excluded 919 who were not sure of pregnancy status and another 568 who chose not to answer the question on pregnancy. The number of respondents increased each year from 15,275 in 1987 to 24,309 in 1997, but the percentage of women who reported they were pregnant varied little over time (average weighted percentage, 5%). Compared with nonpregnant women, pregnant women were more likely to be younger or married. About two thirds of survey participants were white.

Among pregnant and nonpregnant women who reported any alcohol use, 20% also smoked. Among women who reported smoking, 25% of pregnant and 56% of nonpregnant women also drank alcohol. The percentage of women who were concurrent users of tobacco and alcohol decreased significantly among pregnant women from 1987 through 1990 (5.4% to 3.0%) and among nonpregnant women from 1987 through 1991 (17.6% to 14.2%, $P < .05$), but did not vary significantly thereafter. From 1987 through 1997 there was no statistically significant decrease in the percentage of women who were smokers and binge drinkers (pregnant, 1.6% to 1.0%; nonpregnant, 5.6% to 5.4%). Over the entire study period, 0.3% of pregnant women and 2.4% of the nonpregnant women reported smoking and consuming more than one alcoholic beverage a day (an average of eight drinks or more per week).

From 1987 through 1997, pregnancy-related disuse rates increased slightly ($P > .05$) among women who reported concurrent use of tobacco and alcohol (70% [95% CI 59%, 78%] to 82% [95% CI 72%, 93%]) and among women who reported smoking and binge drinking (71% [95% CI 40%, 87%] to 82% [95% CI 62%, 100%]). Among women who smoked and drank more than one alcoholic beverage per day, in all years combined, the pregnancy-related disuse rate was 86% (95% CI 72%, 98%). For women who used both tobacco and alcohol, in all years combined, the pregnancy-related disuse rate was greater for alcohol alone (74%, 95% CI 60%, 89%) than for smoking (52%, 95% CI 42%, 64%).

Young pregnant women (aged 18–20 years) had nearly the same prevalence of concurrent use of tobacco and alcohol as all pregnant women throughout the
study period (Figure 1). The annual variation in the prevalence of concurrent use of both substances among young pregnant and nonpregnant women was not statistically significant (Figure 1, Table 1). There was a sharp decrease in the prevalence of concurrent use among older pregnant women, so by 1997 pregnant women aged 18–20 years had a significantly higher prevalence rate than older women (Table 1). Young women also had smaller pregnancy-related disuse rates than older women (Table 1).

In other population subgroups, the percentage of women who were smokers and drinkers decreased significantly, except among pregnant women who had less than a high school education and among nonpregnant women who were unmarried (Table 1). White women had the largest, and a statistically significant, increase in pregnancy-related disuse rates between 1987 (59%) and 1997 (78%) (Table 1). Among pregnant and nonpregnant women, the prevalence of the concurrent use of tobacco and alcohol was inversely related to education level and was substantially higher among unmarried women compared with married women (Table 1). Among nonpregnant women, those who were nonwhite or unemployed had a higher prevalence of concurrent use of tobacco and alcohol than their counterparts.

**Discussion**

We found that, in the United States, about one of seven nonpregnant women of childbearing age reported using tobacco and alcohol, and most (eight of ten) quit

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**Figure 1.** Combined tobacco and alcohol use in relation to pregnancy. (1) $\frac{1 - (\% \text{ among pregnant} \times \% \text{ among nonpregnant})}{100}$. (2) Data were not collected in most states in 1994 and 1996 and the dotted lines between 1993, 1995, and 1997 indicate assumed values. (3) Overall percentages are age adjusted to the age distribution of pregnant women in 1987 using the following weights, 0.11 for age 18–20 years, 0.52 for age 21–30 years, and 0.38 for age 31–44 years.
using them when they realized they were pregnant. Among pregnant and nonpregnant women, the prevalence of concurrent use declined from 1987 through 1990 and changed little thereafter. Among young pregnant and nonpregnant women, however, there was no significant decrease in the prevalence of concurrent use during the 11-year study period. Compared with older women, young pregnant women were more likely to be concurrent users and least likely to quit when they became pregnant. The likelihood of smokers being alcohol users was higher than the likelihood of alcohol users being smokers.

In this survey, the bias in the reporting of tobacco and alcohol use when asked in relation to pregnancy might be low because the question on pregnancy was asked independently, after questions on smoking and alcohol were asked. By excluding persons without telephones, persons under 18 years old, and those who do not live in private residences, these data might underestimate or overestimate the actual prevalence of smoking and alcohol consumption. Pregnancy-related quitting of concurrent use was higher than reported for tobacco or alcohol alone (50% and 70%, respectively in 1995).8,9 Unmarried women who had the highest prevalence of concurrent use were also among those reported to be at increased risk of tobacco use and alcohol use in other studies.8,9 Despite considerable national efforts to restrict alcohol and tobacco use by young people and by pregnant women, our data indicate that young pregnant women have equal access to those substances, as do older women. The high prevalence of concurrent use among young women who are pregnant might indicate comorbidity, including risky sexual behavior and equally high rates of use among their male peer groups.14

Given that more than half of women do not recognize they are pregnant until after the fourth week of gestation,15 the potential to unknowingly expose a fetus to alcohol or tobacco is high. However, the notion of reducing tobacco and alcohol use before conception15 is simplistic. Addictions to nicotine and alcohol are progressive and chronic. Routine methods to detect alcohol or tobacco abuse might not be sufficient to identify those who abuse alcohol or tobacco. In the United Kingdom, about 16% of a survey’s respondents reported that they did not admit to their doctors that they smoked.16 Given that, on average, women of childbearing age have about 6.4 visits to physicians each year,17 it is feasible to engage them in alcohol and tobacco interventions. Counseling on avoidance of tobacco and alcohol misuse should be integral in care for women of childbearing age, particularly for those who do not use effective contraception. Chronic users of alcohol and tobacco should be advised about opportunities for pregnancy postponement until abstinence is achieved.

Current public health interventions in the United States might have reached their peak in reducing tobacco and alcohol abuse among pregnant women, as was reported for antismoking campaigns in other industrialized countries.16 Developing nations whose smoking and alcohol rates among women are still at low levels have the opportunity to learn from these findings about the difficulties associated with reducing tobacco and alcohol use among established users. The long-term objective of decreasing the burden of pregnancies exposed to tobacco and alcohol can be achieved only by preventing initiation of smoking and alcohol use by young people.

### Table 1. Combined Tobacco and Alcohol Use in Relation to Pregnancy

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* Values are reported for 1987 and 1988 combined because of the small size of pregnant women in some categories.
† Calculated using the formula $\frac{1}{2} \left(\frac{\% \text{ pregnant}}{\% \text{ nonpregnant}}\right) - 1 \times 100$.
§ Within these subgroups, decrease in prevalence rates over time were not statistically significant at .05 level based on weighted least-squares regression models. In all other subgroups, decrease in prevalence rates were significant.

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References


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