Objective: To determine whether office-based interventions change adolescents' alcohol beliefs and alcohol use.

Design: Randomized, controlled trial.

Setting: Five managed care group practices in Washington, DC.

Participants: Consecutive 12- to 17-year-olds (N=409) seeing primary care providers (N=26) for general check-ups. Most of the adolescents (79%) were African American, 44% were male, and 16% currently drank.

Interventions: Usual care (Group I), adolescent priming with alcohol self-assessment just prior to check-up (Group II), adolescent priming and provider prompting with adolescent self-assessment and brochure (Group III).

Main Outcome Measures: Adolescent alcohol beliefs at exit interview and self-reported behaviors at 6- and 12-month follow-up.

Results: At exit interview, Groups II and III reported that less alcohol was needed for impaired thinking and a greater intent to drink alcohol in the next 3 months than Group I. At 6 months, Group III reported more resistance to peer pressure to drink, and Groups II and III reported more binging than Group I. At 1-year follow-up, controlling for baseline levels, Groups II (odds ratio [OR], 3.44; 95% confidence interval [CI], 1.44-6.24) and III (OR, 2.86; CI, 1.13-7.26) reported more binging in the last 3 months than Group I. Group II reported more drinking in the last 30 days (OR, 2.31; CI, 1.31-4.07) and in the last 3 months (OR, 1.76; CI, 1.12-2.77) than Group I.

Conclusion: Brief office-based interventions were ineffective in reducing adolescent alcohol use but may increase adolescent reporting of alcohol use.

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NATIONALLY, APPROXIMATELY 41% OF NINTH-GRADE STUDENTS HAD AT LEAST 1 DRINK IN THE LAST MONTH.1 AMONG SEXUALLY ACTIVE NINTH GRADERS, 24% USED ALCOHOL OR DRUGS AT THEIR LAST SEXUAL INTERCOURSE.1 THE DEVASTATING CONSEQUENCES OF ALCOHOL MISUSE AMONG ADOLESCENTS, SUCH AS INJURY, SEXUALLY TRANSMITTED DISEASES, VIOLENCE, AND POOR SCHOOL PERFORMANCE, HAVE BEEN CLEARLY IDENTIFIED.2,3 AS A PRIMARY PREVENTION MEASURE, CLINICAL PRACTICE GUIDELINES RECOMMEND THAT PRIMARY CARE PROVIDERS (HEREAFTER REFERRED TO AS PROVIDERS) SCREEN, EDUCATE, AND COUNSEL ALL ADOLESCENTS ABOUT ALCOHOL USE AND ITS ASSOCIATED RISKS AS PART OF CONFIDENTIAL DISCUSSIONS DURING HEALTH CHECK-UPS.3,4

Although recent evidence suggests that brief office-based interventions can be effective in reducing alcohol misuse among adults,7-10 the efficacy of office-based approaches to reducing alcohol use has not been demonstrated among adolescents. In fact, no consensus has been reached on the most effective prevention approaches or programs for adolescent alcohol misuse.11 Evaluations of psychosocial and educational interventions targeting the primary prevention of alcohol misuse by people up to 25 years old were recently reviewed.12 The 56 rigorous available studies, of 600 reports identified, showed mixed findings.

In a prior study at several Washington, DC, managed care settings, a 1-time office-based intervention on sexual risk reduction increased adolescent-provider discussion about sexual risks and, subsequently, adolescent condom use during the short-term.13 However, only 49% of adolescents receiving the general health check-ups reported that their providers talked with them about alcohol.13 In a follow-up study, we conducted a random-
ized, controlled trial of brief, office-based interventions to reduce alcohol use among adolescents aged 12 to 17 years old. One intervention (adolescent priming) consisted of a 15-minute previsit audio program to educate adolescents about alcohol and to prime them to discuss it in their check-up. Another component (provider prompting) consisted of using educational materials and adolescents’ alcohol self-assessments to prompt providers to discuss alcohol in the office visit. We reported how the combination of these intervention components increased adolescent-provider communication about alcohol.14

Here we examine the outcomes of the alcohol prevention trial. We determine which type of intervention is more likely to reduce adolescent alcohol use as measured through adolescent self-report at 6- and 12-month follow-up: priming adolescents, or priming adolescents and prompting providers.

METHODS

SUBJECTS AND SETTING

Participating university and health plan institutional review boards approved this study. This was a 3-group trial with 2 intervention arms and a control arm. Adolescents were enrolled in the study from January 3, 2000, to October 31, 2000, and the final adolescent survey was completed on January 20, 2001. The aim of the interventions was to reduce adolescent alcohol use. Participating study sites were 5 managed care organizations in the District of Columbia and 3 in adjoining Maryland suburbs. To meet all eligibility criteria, each adolescent had to receive a general health examination from a study provider, be 12 to 17 years old, be the first sibling from his or her family to be recruited into the study, have the visit scheduled at least 7 business days in advance, and be able to hear and comprehend the interviewer’s questions in English. Seven business days were needed to send recruitment mailings and make calls to parents, and to avoid adolescent visits for an acute health problem but labeled as general health check-ups for confidentiality reasons. At the time of the appointment, a researcher obtained the parent’s written consent for the study. Researchers confirmed written study consent from adolescents in a private room without their parents present. All consenting parents received a booklet entitled All About Underage Drinking,15 and all parents and adolescents received a list of substance use and crisis support services for youth prepared by the research team.

RANDOMIZATION AND BLINDING

Assignment to study group was based on a computer-generated randomization, stratified by provider as well as adolescent sex and age (12-13, 14-15, 16-17 years). In the provider office, just before the health check-up and after administration of an intake questionnaire, the research assistant, who was blind to the adolescent’s assignment, opened a sealed envelope containing the adolescent’s random assignment. The researcher then proceeded to administer the appropriate audio program and provider prompts depending on the adolescent’s assignment to Group I, II, or III.

STUDY INTERVENTIONS

The study audio program included music, several voices of male and female adolescents, and voices of a male provider and a female provider. The messages were framed around the Social Cognitive Theory16 and the Health Belief Model.17 Resistance to peer pressure to drink and abstinence from alcohol use were the targeted behaviors. The audio program modeled an adolescent going to see his physician for a health check-up, asking about confidentiality, and being encouraged to talk about risk behaviors by the physician. After a fade, the physician was joined by another physician, and the physicians asked the study participant 9 questions about alcohol use and related risks. Adolescents recorded their answers on an answer sheet. Once the questions were asked, the tape addressed the consequences of a “yes” or “no” answer to each question. As it addressed the consequences, the tape provided testimonials of other adolescents who wished they had avoided alcohol, and it ended with adolescents talking about activities they enjoy that do not involve alcohol (transcript available from the corresponding author).

Development of the audio program involved pretesting versions of the audio with focus groups of adolescents (n = 144) in urban and suburban settings. Across time, the audio shifted from being dominated by physicians providing advice and instruction to a balance between physician communication and adolescent testimonials because adolescents thought the latter approach would be more attention-getting and address adolescents’ sense of invulnerability. The study audio program was administered to adolescents using an audio player and head-set. A brochure entitled When You’re With Friends—Handling the Pressure to Drink,18 from Channing L. Bete Company (South Deerfield, Mass), was also selected as part of the study intervention based on adolescent focus group pretesting.

At commencement of the study, the study providers received a 30-minute briefing during a group practice lunch meeting at their offices. Researchers described the intervention materials and ways to ask parents to leave the visit at an appropriate time to allow private discussion with the adolescent. Researchers also distributed a monograph on the rationale and approach for the intervention materials. The principal investigator left a brief voice mail message once each quarter during the 1-year data collection as a reminder to use the intervention materials.

In addition to receiving their usual care with their providers, adolescents in Group I were given an audioplayer and head-set to listen to radio selections of their choice for 15 minutes after their intake study questionnaire and just before their health examination. This was to ensure that Group I adolescents experienced the same wait times as other study adolescents.

Adolescents in Group II received the 15-minute study audio program just before their health examination. Adolescents in Group III received the same audio program as Group II. In addition, in Group III, the researcher placed the study brochure, the adolescent’s alcohol self-assessment answer sheet, and a copy of the substance abuse and crisis support community services list in a bright yellow bag along with an adolescent self-assessment template for the provider to use to interpret the adolescent’s responses to the questions. The researcher placed the bag on the doorknob of the adolescent’s examination room before the provider’s arrival.

Adolescents in Groups II and III listened over the telephone to the audio program for a second time at the end of the 6-month follow-up telephone interview, the first time being just prior to the study office visit with the physician. The replaying of the audiotape served as an educational booster intervention.

MEASURES

The primary method of data collection was the adolescent survey, and adolescents received a movie ticket for each survey that they completed. At baseline and exit interviews in the managed care organization, female researchers administered ques-
tionnaires in private rooms. Before questionnaire administration, adolescents read aloud the most complex response set to confirm adequate literacy. Researchers then read the questions, and adolescents responded by circling their answers on response sheets with only response options and no questions. Baseline study variables measured by previout questions included adolescent age, sex, ethnicity, whether they had been seen by the study providers before, exposure to peer drinking, and drinking experiences. Beliefs about alcohol and mood were measured during the exit interviews. Exposure to peer drinking, drinking experiences, and mood were measured at 6- and 12-month follow-ups. The follow-up interviews were conducted by female researchers over the telephone. The adolescent responded to questions read by the researcher by pushing the button on the telephone that corresponded to the answer on the answer sheet, which had been previously mailed to them. The researcher obtained the response through a digit meter and transferred it to an answer sheet. This follow-up method was previously found to be reliable and valid as comparison methods. To confirm the reliability of the methods in this study, a summative scale of 9 items measuring mood asked at each time point was examined for internal consistency and test-retest correlation, and reliability was confirmed (baseline Cronbach α = .74; 6-month Cronbach α = .77; 1-year Cronbach α = .77; baseline and 6-month Pearson correlation = .6, 6-month and 1-year Pearson correlation = .56).

Multiple variables to assess beliefs about alcohol were measured in the exit interviews to correspond with elements in the educational interventions. Sources of variables were as referenced below; otherwise, variables were developed by the authors and pretested with in-depth probing of approximately 20 adolescents. Six questions about alcohol beliefs were used to calculate a summative index of the number of correct answers; for example, “One shot of whiskey has twice as much alcohol as a 12-oz can of beer: yes, no?” (total score mean±SD=4.95±.98; range, 1-6; median, 5; mode, 5). Six alcohol-refusal self-efficacy questions were used to calculate a summative scale; for example, “How hard would it be to not drink alcohol if your friends were drinking alcohol: Really hard, a little hard, not hard at all?” (total score mean±SD=15.83±2.4; range, 6-18; median, 17; mode, 18; Cronbach α = .77) Three perceived negative outcome expectation questions were used to calculate a summative scale; for example, “Do you think you would get into trouble if you drank a few drinks of alcohol: definitely no, probably no, probably yes, definitely yes?” (total score mean±SD=11.63±2.42; range, 4-16; median, 12; mode, 13; Cronbach α = .69). One perceived alcohol tolerance question was used: “How much alcohol do you think you would have to drink before your ability to think clearly would be affected: 1, 2, 3, 4, or 5 or more drinks?” One question about intention to drink was used: “Do you think you will drink alcohol in the next 3 months: yes, no, not sure?”

Alcohol-related outcomes were measured by occurrence of drinking at least 1 drink of alcohol during the last 30 days and during the last 3 months, drinking 5 or more drinks in a row during the last 3 months, and drinking alcohol before sexual intercourse during the last 3 months. Peer exposure to alcohol use was measured by occurrence of hanging around friends while they were drinking in the last 30 days. Alcohol refusal was measured by occurrence of never drinking even when other teens asked the adolescent to drink.

Several measures were obtained not through adolescent self-report but through other means. These variables were considered to be important covariates in the analysis of outcomes based on theoretical associations, relationships observed in exploratory analysis of the data, or acknowledgment that adolescents shared physicians and practice sites. These variables included office location (District of Columbia = urban, surrounding Maryland counties = suburban), provider sex, and study cohort (1, 2). This study was suspended after the first 246 subjects (cohort 1) had been enrolled owing to institutional review board concerns over adolescents’ responses to questions about suicidal thoughts. After the consent form was changed from unconditional to conditional confidentiality regarding suicidal thoughts, the study was resumed, and another 163 subjects (cohort 2) were enrolled.

STATISTICAL HYPOTHESES, POWER, AND METHODS

The primary hypothesis was that Groups II and III adolescents would report less alcohol use at the 12-month follow-up than Group I adolescents. Based on 2-tailed tests, sample size of 135 per group, binary outcomes, and variable observed rates across alcohol outcomes at 1 year, adequate power (80%) was available to detect small effect sizes equating to a difference in proportions of 10% to 15%. Controlling for multiple covariates and repeated measures in generalized estimating equations was expected to improve power because covariates were expected to be informative and independent of treatment.

The units of random assignment and analysis were adolescents. All subjects were analyzed as they were originally randomly assigned to study groups. Groups II and III were contrasted with Group I while we controlled for covariates in regression models. For all regression models, 95% confidence intervals were calculated for each contrast estimate. Covariates in all analyses of adolescent beliefs and alcohol outcomes included cohort of the study (1, 2), physician sex, office location (urban, suburban), whether the adolescent had seen the provider before (yes, no), adolescent age (12-13, 14-15, 16-17 years), adolescent sex, whether the adolescent drank in the last 3 months at baseline, and adolescent ethnicity (African American, other). Covariates that were insignificant on all analyses were subsequently dropped from final analyses. For binary outcome variables, the repeated-measures option in PROC GENMOD of SAS (SAS Institute, Cary, NC) was used to account for correlation within providers, an approach based on generalized estimating equations. A multiple linear regression model with a random provider effect was performed with PROC MIXED of SAS when the outcome of interest was continuous. We modified the model to include time and time times treatment interactions but assumed covariate effects were constant within providers. We considered the baseline value (ie, at 0 months) as a covariate in addition to the covariates above. We modified the model to include time and time times treatment interactions but assumed covariate effects were the same for both time points (ie, 6 and 12 months). Because we now had 2 observations per subject and we still wished to consider correlation among observations within the same provider, we used an alternating logistic regression model and implemented it in PROC GENMOD. Alternating logistic regression is like generalized estimating equations in that it approximates the correct standard errors while accounting for associations expected, namely observations within patients and patients within providers. Estimate statements were used to calculate odds ratios that correspond to calculated treatment effects within each time period (ie, 6 and 12 months).

RESULTS

PARTICIPATION, RANDOMIZATION, AND DROP-OUT

Participation and random assignment are briefly described here, and additional information is available. At 5 Washington, DC, metropolitan area managed care organization group practices (2 urban, 3 suburban), 26
providers participated in this study. Study providers were in pediatrics (n = 22) and family practice (n = 4) and included 5 nurse practitioners and 21 physicians. The providers ranged in age from 31 to 62 years old (mean±SD=42.36±8.4 years); 20 were female, 13 were white, 9 were African American, 3 were Asian American, and 1 was Hispanic. All providers received their medical training in the United States. The number of study adolescents seen by each provider ranged from 1 to 50 (mean±SD=17.07±15.89).

During the study period, 892 adolescents met eligibility criteria. Of these, 445 adolescents did not participate owing to refusals and logistical problems (Figure). The remaining 447 adolescents agreed to participate and were randomly assigned to study groups. Three adolescents who were randomly assigned to Group II did not complete baseline data collection and were excluded from analyses. Previous results did not reveal differences between study participants and all eligible adolescents.14 Of the 444 adolescents who were randomly assigned and completed baseline data collection, 409 adolescents completed the 1-year follow-up and became the subjects for these analyses (follow-up rate=92%). Excluding adolescents who could not be reached by telephone before their visits and who did not arrive at the time of their scheduled visits, the overall participation rate for the study was 409/784 (52.2%). The mean±SD number of days from the intake data collection to the 6-month follow-up data collection was 173.8±16.63 days, and to the 12-month follow-up data collection the mean was 352.66±16.27 days. The Group I, II, and III dropout rates by arm from baseline to 12-month follow-up were 14/150 (9.3%), 12/147 (8.2%), and 9/147 (6.1%), respectively (χ², P=.58). It was noted that the 1-year dropout in Group I was associated with drinking in the last 3 months at baseline (Fisher exact test, P=.04). Rates of baseline drinking among 1-year drop-outs were Group I, 42.3%; Group II, 16.7%; and Group III, 11.1%.

The 6-month and 1-year outcomes were analyzed using the 1-year sample (N=409) because the primary hypothesis was based on 1-year outcomes. Of the 409 participants, 2 Group II adolescents and 1 Group III adolescent did not complete 6-month data collection. None of the 3 missing cases had drunk in the last 3 months at baseline.

Comparisons of various adolescent characteristics among study groups revealed 2 possible differences (Table 1). The proportion of African Americans differed by group and was lowest in Group III.
line appeared lower in Group I. All of the adolescent characteristics were examined as potential covariates in the analyses.

INTERVENTION FIDELITY

Intervention fidelity has been described previously and is summarized here. All Group I adolescents listened to a radio selection of their choice for 15 minutes before the visit. Almost all adolescents in Group II (99.3%) and Group III (99.3%) received the 15-minute audio intervention program. The intervention bag was placed on the examination room doorknob for almost all adolescents in group III (99.3%). Among Group III adolescents, 86.7% reported at the exit interviews that they saw their providers look at their alcohol risk self-assessment sheets. Although 4% of adolescents in Group I and 7.5% of adolescents in Group II reported that their providers opened a brochure to discuss information about alcohol, 41.5% of Group III adolescents reported this. Although 13.3% of adolescents in Group I and 11.6% of adolescents in Group II reported that their providers gave them something to read about alcohol, 66% of Group III adolescents reported this.

Comparisons of each intervention group with the usual-care control group indicated that more provider discussion took place on all of 7 alcohol topics in Group III vs Group I. There were no differences in adolescent-reported provider discussion about alcohol topics between Group II and Group I.14

After the 6-month follow-up telephone interview, all of Groups II and III adolescents received the 15-minute booster audio intervention program.

BELIEFS ABOUT ALCOHOL

Beliefs were measured at exit interview immediately after the general health examination. An index of beliefs about alcohol showed no differences between Group I and Groups II and III (Table 2). Likewise, no differences were observed between groups regarding negative outcome expectations of alcohol use and alcohol refusal self-efficacy. Nevertheless, differences were observed regarding perceived alcohol tolerance such that Groups II and III reported lower average number of drinks needed to impair clear thinking than Group I. More Groups II and III participants reported an intention to drink in the next 3 months than Group I participants.

ALCOHOL USE OUTCOMES

Alcohol use and related behaviors were assessed at 6 months to determine short-term impact of the interventions. Group III was more likely than Group I to report having refused to drink alcohol when asked to drink by other teens (odds ratio [OR], 2.08; confidence interval [CI], 1.29-3.35). Groups II and III were more likely than Group I to report having binged in the last 3 months (OR, 3.44; CI, 1.07-11.01; and OR, 4.71; CI, 1.55-14.30, respectively) (Table 3).

Alcohol use and related behaviors were assessed at 1 year to determine longer-term impact of the interventions. Group II was more likely than Group I to report having drunk alcohol in the last 30 days (OR, 2.31; CI, 1.31-4.07) and last 3 months (OR, 1.76; CI, 1.12-2.77). Group II and III adolescents were more likely than Group I to report having binged in the last 3 months (OR, 3; CI, 1.44-6.24; and OR, 2.86; CI, 1.13-7.26, respectively).

The results of this study indicated that the study interventions provided some educational benefits. Administration of a previsit audio program just prior to adolescents’ health check-ups increased adolescents’ perceived sensitivity to the psychological effects of alcohol. Administering the previsit audio program and then prompting the provider to discuss alcohol with an adolescent alcohol self-assessment and a brochure on resisting peer pressure to drink increased adolescents’ refusal of peer pressure to drink at 6-month follow-up. Also, the interventions appeared to increase adolescent forthright reporting of intention to use alcohol and alcohol use. Nevertheless, the interventions were ineffective in reducing alcohol use.

A first review of the study results suggests, unexpectedly, that adolescents who received the brief office-based interventions reported a greater increase in alcohol use during 1 year of follow-up than the control group. Both intervention groups (Groups II and III) reported more bingeing than the control group (Group I), and the intervention group that received the previsit audio program alone (Group II) reported more drinking during the last 30 days and 3 months than Group I. This is not the only study to present findings of a possible adverse

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**Table 2. Adolescent Perceptions About Alcohol at Exit Interview***

<table>
<thead>
<tr>
<th>Study Group</th>
<th>Brief</th>
<th>Usual Care</th>
<th>Audio Only</th>
<th>Audio + Provider</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SE) alcohol beliefs†</td>
<td>5.01 (.10)</td>
<td>5.08 (.10)</td>
<td>5.02 (.10)</td>
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<tr>
<td></td>
<td>Mean (SE) negative outcome expectations†</td>
<td>11.49 (.28)</td>
<td>11.17 (.25)</td>
<td>11.32 (.24)</td>
</tr>
<tr>
<td></td>
<td>Mean (SE) refusal self-efficacy‡</td>
<td>15.98 (.28)</td>
<td>15.97 (.24)</td>
<td>15.78 (.24)</td>
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<tr>
<td></td>
<td>Mean (SE) perceived alcohol tolerance‡</td>
<td>3.00 (.15)</td>
<td>2.05 (.13)</td>
<td>2.05 (.13)</td>
</tr>
<tr>
<td>Percent intend to drink in next 3 months§</td>
<td>5.9</td>
<td>15.6</td>
<td>13.8</td>
<td></td>
</tr>
</tbody>
</table>

*Adjusted least square means and standard errors for Group I are significantly different (P < .05) from those for Groups II and III using the Tukey-Kramer multiple comparison procedure in SAS Proc Mixed (SAS Institute Inc, Cary, NC).
†Adjusted least square means and standard errors for Group I are significantly different (P < .05) from those for Groups II and III using the Tukey-Kramer multiple comparison procedure in SAS Proc Mixed.
‡The displayed percentages are unadjusted. Percentages for Group I are significantly different (P < .05) from those for Groups II and III after adjustment in mixed model logistic analysis.

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From this, it appears that control-group adolescents reported lower absolute rates of bingeing at follow-up than at baseline; the Youth Risk Behavior Surveys reported bingeing as measured at 24- and 36-month follow-ups. That intervention also increased adolescent-reported alcohol use in the intervention groups relative to the control groups is the result of an educational intervention influence leading adolescents to be more forthright. This potential difference in report bias between groups was not the result of different data collection methods. When collecting data, the researchers handled all adolescents similarly across groups. Adolescent self-reported risk behaviors, and self-reported risk behaviors measured through touch-tone telephone response, have been found to be reliable in previous studies. Other study limitations should be considered. With regard to the study design, the randomized, controlled trial helps to rule out threats to the internal validity of the study. We observed that random assignment was not

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Month</th>
<th>Group I, % (n = 138)</th>
<th>Group II, % (n = 135)</th>
<th>II vs I, OR (95% CI)*</th>
<th>Group III, % (n = 138)</th>
<th>III vs I, OR (95% CI)*</th>
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</thead>
<tbody>
<tr>
<td>Hung around with friends while they drank</td>
<td>0</td>
<td>14.7</td>
<td>16.3</td>
<td>Referent</td>
<td>23.9</td>
<td>Referent</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>21.3</td>
<td>22.6</td>
<td>1.17 (0.57-2.40)</td>
<td>33.6</td>
<td>1.74 (0.90-3.35)</td>
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<td></td>
<td>12</td>
<td>29.4</td>
<td>28.1</td>
<td>1.03 (0.63-1.69)</td>
<td>33.3</td>
<td>1.04 (0.60-1.81)</td>
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<td>Refused to drink when asked by others</td>
<td>0</td>
<td>50.3</td>
<td>61.7</td>
<td>Referent</td>
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<td>Referent</td>
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<td>55.9</td>
<td>60.6</td>
<td>1.27 (0.76-2.13)</td>
<td>72.8</td>
<td>2.08 (1.29-3.35)†</td>
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<td>61.0</td>
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<td>17.0</td>
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<td>Referent</td>
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<td>24.1</td>
<td>1.29 (0.67-2.49)</td>
<td>29.2</td>
<td>1.49 (0.80-2.80)</td>
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<td>12</td>
<td>23.5</td>
<td>37.8</td>
<td>2.31 (1.31-4.07)†</td>
<td>29.7</td>
<td>1.25 (0.76-2.06)</td>
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<tr>
<td>Drank last 3 mo</td>
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<td>18.4</td>
<td>28.9</td>
<td>Referent</td>
<td>29.7</td>
<td>Referent</td>
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<tr>
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<td>6</td>
<td>20.6</td>
<td>32.3</td>
<td>1.87 (0.81-4.30)</td>
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<td>1.65 (0.96-2.79)</td>
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<td>12</td>
<td>30.1</td>
<td>43.7</td>
<td>1.76 (1.12-2.77)†</td>
<td>38.4</td>
<td>1.22 (0.79-1.89)</td>
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<td>Binged last 3 mo</td>
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<td>5.9</td>
<td>7.4</td>
<td>Referent</td>
<td>8.7</td>
<td>Referent</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>3.7</td>
<td>10.5</td>
<td>3.44 (1.07-11.01)†</td>
<td>14.6</td>
<td>4.71 (1.55-14.30)†</td>
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<td>12</td>
<td>5.1</td>
<td>11.1</td>
<td>3.00 (1.44-6.24)†</td>
<td>13.0</td>
<td>2.86 (1.13-7.26)‡</td>
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</table>

Abbreviations: CI, confidence interval; OR, odds ratio.

*Contrast vs Group I after controlling for cohort (1, 2), physician sex, office location (urban, suburban), whether adolescent had seen the provider before (yes, no), adolescent age, adolescent sex, whether adolescent drank in last 3 months at baseline, and adolescent ethnicity (African American, other).

†P<.01.
‡P<.05.

effect of an office-based intervention on alcohol use by adolescents. Another recent study by Stevens et al28 attempted to use pediatric primary care clinicians as counselors and role models for fifth- and sixth-grade adolescents. In that randomized trial, clinicians encouraged family communication and rule-setting about alcohol. That intervention also increased adolescent-reported drinking as measured at 24- and 36-month follow-ups. However, further examination of the data from the current study provides a plausible explanation for the unexpected findings regarding the apparent increase in alcohol use in response to the brief interventions. Overall, the data suggest that intervention adolescents were more forthright than control adolescents with regard to reporting intentions to use alcohol and alcohol use. First, adolescents in the control group, unlike adolescents in the intervention groups, reported less bingeing after baseline, suggesting self-report bias in the direction anticipated if the control adolescents were trying to please the researchers. It is indeed odd that control-group adolescents reported lower absolute rates of bingeing at follow-up then at baseline; the Youth Risk Behavior Survey suggests that rates of bingeing increase with age among adolescents.3 From this, it appears that control-group adolescents underreported alcohol use.

Second, adolescents in the intervention groups increased their reported alcohol use across time relative to the control group, suggesting they were more forthright. Perhaps the audio education was effective in encouraging adolescents to talk to the provider openly about their alcohol use, and this encouragement generalized to the research data collection. Given that (1) reporting alcohol use countered the intended alcohol risk prevention messages in the audio program and countered the expectation that adolescents in intervention groups would bias their responses to please the researchers, (2) the previsit audio program emphasized to adolescents the importance of openly discussing alcohol use with the provider, and (3) prior analysis showed that adolescents in the intervention groups talked more and asked their provider more questions about alcohol and other topics,14 it is highly plausible that the apparent increase in self-reported alcohol use in the intervention groups relative to the control groups is the result of an educational intervention influence leading adolescents to be more forthright. This potential difference in report bias between groups was not the result of different data collection methods. When collecting data, the researchers handled all adolescents similarly across groups. Adolescent self-reported risk behaviors, and self-reported risk behaviors measured through touch-tone telephone response, have been found to be reliable in previous studies.19,20,29,30

Interestingly, the adolescent audio-priming and provider-prompting interventions used in the present study were previously shown to be effective in increasing self-reported condom use at 3-month follow-up, suggesting that the same interventions may affect self-reported condom use and self-reported alcohol use differently.13 Other brief office-based interventions have been shown to be effective in increasing condom use among adolescents.31,32 Hence, while brief office-based interventions may be effective in encouraging adolescents to increase reported condom use, such interventions have not yet been shown to be effective in decreasing reported alcohol use.28 It is possible that the condom-use message is more readily accepted and easily implemented by adolescents than the alcohol-avoidance message. It is also possible that adolescents feel more threatened about admitting alcohol use to adults, making research based on adolescent self-report of alcohol use less reliable and more prone to problems with internal validity.

Other study limitations should be considered. With regard to the study design, the randomized, controlled trial helps to rule out threats to the internal validity of the study. We observed that random assignment was not
Brief office-based education and counseling have been shown to reduce alcohol use among adults. Brief office-based counseling to delay or reduce alcohol use among adolescents has not been previously evaluated.

This study suggested that brief office-based education and counseling increased adolescents’ perceived susceptibility to the psychological effects of alcohol and their refusal of peer pressure to drink. Brief intervention probably also increased adolescents’ forthright self-reports of their own alcohol use intentions and behaviors, but no evidence suggested that it reduced alcohol use.

Although the results of this study suggest that the interventions were ineffective in decreasing alcohol use, the interventions were effective in other important ways. Both the audio alone and the audio plus physician prompting increased adolescents’ belief that alcohol can influence one’s ability to think clearly. This message was emphasized in the audio program. At 6 months, adolescents in the audio plus physician-prompting intervention reported more refusals to drink under peer pressure. The study intervention trained providers at the beginning of the study to reinforce skills for refusing peer pressure to drink, using the brochure that was included in the prompting bag.

This study focused on directing adolescents to avoid alcohol use. The ineffectiveness of this approach may suggest that harm reduction or other approaches to alcohol prevention warrant further investigation with adolescents. Harm reduction approaches toward alcohol use attempt to address people with regard to their current alcohol use and to assist them in achieving healthier levels of drinking, whether that level is abstinence, moderate drinking, or the reduction of alcohol-related harm. Although there is little research on harm-reduction approaches for the prevention of alcohol use in adolescents, particularly younger adolescents, motivational enhancement therapy, as a potentially effective approach to counseling youth who have suspected substance abuse problems, has been described.

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