Effect of Patient Priming and Primary Care Provider Prompting on Adolescent-Provider Communication About Alcohol

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Objective: To determine whether priming adolescent patients to discuss alcohol with their primary care providers and prompting providers to discuss alcohol increases adolescent-provider communication about alcohol.

Design: Randomized controlled trial.

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

Participants: Consecutive patients aged 12 to 17 years who were seeing primary care providers (n = 26) for health checkups. Of 892 eligible adolescents, 444 (50%) were randomized and completed data collection. Most adolescents (80%) were African American, 55% were male, and 17% currently drank alcohol.

Intervention: Usual care (group 1) vs adolescent priming with alcohol self-assessment and education just before their health checkups (group 2) vs adolescent priming and provider prompting with the adolescent’s self-assessment and a patient education brochure (group 3).

Main Outcome Measures: This exploratory sub-study of a longitudinal study on adolescent alcohol behaviors examined adolescent-provider communication by adolescent exit survey, researcher observation, and audiotapes of a subsample of visits.

Results: More adolescents in group 3 (96%) than group 1 (87%) reported that their provider talked about alcohol (adjusted odds ratio [OR], 1.10; 95% confidence interval [CI], 1.04-1.17). More adolescents in group 3 (18%) than group 1 (10%) reported asking about alcohol (adjusted OR, 1.08; 95% CI, 1.00-1.16). The mean ± SD number of minutes adolescents were with their providers without parents being present was greater for group 3 (10.8 ± 7.6) than group 1 (8.8 ± 8.0). Adolescents in group 2 spent more time with their provider and reported initiating more discussion not specific to alcohol than did group 1 adolescents.

Conclusion: Adolescent priming and provider prompting increases adolescent-provider communication about alcohol.

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Guidelines recommend that primary care providers (hereafter referred to as providers) screen and counsel all adolescents about alcohol and its risks as part of confidential discussions in annual health checkups.1-4 Unfortunately, these guidelines are not consistently followed.5,6 A recent national sample of pediatricians and family practitioners self-reported that they provide alcohol-related screening and education to 40.3% and 52.0%, respectively, of their adolescent patients.7

Priming patients, either through coaching or prompt sheets, to ask questions during medical visits can increase the number of questions patients ask.7-9 Providers may give more information to patients who ask more questions.9 In addition, providers are more likely to provide behavioral assessments and counseling when they are prompted through chart stickers, checklists, or patient screening forms.10-15 Increased provider inquiry and counseling may increase patient questioning and disclosure during medical visits.16-19

In a prior study at several Washington, DC, managed care sites, only 49% of adolescents receiving typical general health checkups reported that their provider talked with them about alcohol.15 In a follow-up study, we developed a priming (cognitive learning) intervention aimed at increasing adolescents’ communication with their provider about alcohol. The basis was the Health Belief Model and the Social Cognitive Theory, which together posited that behavior could be changed through perceived threat and enhanced self-efficacy.20,21 We also developed a prompting (environmental reminder) intervention aimed at increasing providers’ communication with their adolescent patients about alcohol. The prompt was used...
as a cue to initiate a procedure that could be overlooked\textsuperscript{20,22} and a quality improvement reminder that practice was being monitored.\textsuperscript{23}

As a preliminary evaluation of a provider office-based, longitudinal intervention trial to reduce adolescents’ alcohol-related risk behaviors, we determined which type of intervention was more likely to increase adolescent-provider communication about alcohol in general health checkups: priming adolescents or priming adolescents and also prompting providers. Two sources of data were examined: adolescent reports about their communication with their provider and researcher observation of the length of communication. Because communication was reciprocal, we examined both the potential of adolescents to more actively communicate with their provider and whether providers can facilitate communication about alcohol.

METHODS

SUBJECTS AND SETTING

Participating university and health plan institutional review boards approved this study. This was a substudy of a randomized, 3-group trial with 2 intervention arms and a control arm. The aim of the interventions was to improve adolescent-provider communication about alcohol, and the study was conducted from January 3, 2000, through October 31, 2000. Participating study sites were 3 managed care organization primary care group practices, 2 in Washington, DC, and 3 in adjoining Maryland suburbs.

To meet all eligibility criteria, adolescents had to receive a general health examination from a study provider, be aged 12 through 17 years, be the first sibling from their family to be recruited into the study, have their 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 that were labeled as general health checkups for confidentiality reasons. At the time of the appointment, a researcher obtained the parent’s written consent for the study. Researchers confirmed written study and audiocassette assent from adolescents in a private room without their parent present.

RANDOMIZATION AND BLINDING

Study group assignment was based on computer-generated randomization, stratified by provider as well as adolescent age (12-13, 14-15, and 16-17 years) and sex. The principal investigator (B.O.B.) created sealed envelopes. In the provider’s office just before the health checkup and after administration of an intake questionnaire, the research assistant, who was blinded to the adolescent’s group assignment, opened the sealed envelope containing the adolescent’s random assignment. The researcher then proceeded to administer the appropriate audio program on a portable audio-player with a headset and the provider prompts, exceeded to administer the appropriate audio program on a provider communication about alcohol in general health checkups: priming adolescents or priming adolescents and also prompting providers. Two sources of data were examined: adolescent reports about their communication with their provider and researcher observation of the length of communication. Because communication was reciprocal, we examined both the potential of adolescents to more actively communicate with their provider and whether providers can facilitate communication about alcohol.

STUDY INTERVENTIONS

At commencement of the study, providers received a 50-minute briefing during a group practice lunch meeting at their office. 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. The principal investigator left a brief voice-mail message as a reminder to use the intervention materials once each quarter during the 1-year data collection period.

Besides receiving their usual care from their provider, adolescents in group 1 were provided with an audio-player and headset to listen to radio selections of their choice for 15 minutes after their intake study questionnaire. This was to ensure that group 1 adolescents experienced the same wait times as other study adolescents.

Adolescents in group 2 received a 15-minute audiobased program (transcripts available from the corresponding author). The audio program was administered through a portable audio-player and headset. The audio program included music, several voices of adolescents, and voices of one male and one female physician. The program consisted of 3 major sections. The first section addressed adolescents’ concerns about confidentiality and the importance of discussing personal behaviors during health checkups. The first section also modeled an adolescent asking a provider questions. The second section consisted of an alcohol risk behavior self-assessment in which questions about risk were read by providers and adolescents provided answers on a sheet that only had yes and no response options. Adolescents were told in the audio program that their own provider might review their answers as part of their upcoming checkup. The physicians asked 9 questions about the alcoholic content of drinks, the relationship of alcohol with the major causes of death among adolescents, social activities with other teenagers who are drinking alcohol, the patient’s own alcohol and other substance use, drinking and driving, driving and drinking and decision making. In the second section, the audio program reviewed possible health risks associated with yes or no answers. The physicians ended the self-assessment by encouraging adolescents to talk to their provider about their answers and any questions they had about alcohol-related risks. This was the end of the intervention for group 2 adolescents.

Adolescents in group 3 received the same intervention as was used with adolescents in group 2. In addition, the researcher placed the adolescent’s answer sheet in a bright yellow bag along with an adolescent risk assessment template for the provider to use to interpret the adolescent’s responses. Also in the bag was the brochure on alcohol risk reduction. The researcher placed the bag on the doorknob of the adolescent’s examination room.

MEASURES

The primary method of data collection was adolescent survey. Female researchers administered questionnaires in a private room in the provider’s office. The researchers read the questions and adolescents responded by circling their answer on a response sheet. The response sheet only had response options, no questions. Before the questionnaire was administered, adolescents read aloud the most complex response set to confirm adequate literacy. Two questionnaires were administered, 1 just before the health checkup and 1 immediately after the checkup. Interviewers were thus blinded to the adolescent’s group assignment for the previst interview only. Study variables measured by previst questions included adolescent age, sex, and previous care by the study provider. Other study variables were measured by postvisit questions. Adolescents were asked whether the provider asked them if they used alcohol (responses coded yes vs no and not sure), when they said something to the provider during the visit (responses coded “when the doctor asked me a question” and at other times vs “never, I only listened” and “only when the doctor asked me a question”), how many questions they asked the provider about alcohol (responses coded 0 vs $\geq 1$), how many questions they asked the provider (responses coded 0 vs $\geq 1$), and how they
would describe themselves (responses coded black or African American vs other ethnicities). Adolescents were asked 7 questions about whether the provider talked about topics ranging from the “effects of alcohol on decision making” to the “risks of combining drinking and sex” (responses coded not at all vs a little and a lot). The summed index ranged from 0 to 7 and was recoded as 0=no discussion vs 1=discussion.

Researchers used stopwatches to time the length of communication between adolescents and providers. Researchers stood in view of adolescent examination rooms, but far enough away to maintain patient privacy. The time that anyone entered or left the room was written on a form.

**STATISTICAL HYPOTHESES, POWER, AND METHODS**

It was hypothesized that (1) priming adolescents to discuss alcohol with their provider would increase the proportion of adolescents who reported asking their provider about alcohol and (2) priming adolescent patients and also prompting their providers to discuss alcohol would increase both the proportion of adolescents who reported asking their provider about alcohol and the number of adolescents who reported that their provider talked with them about alcohol and asked them about their alcohol use. Power was established for the longitudinal study, of which this is a substudy, on a smaller sample size than was anticipated in this substudy. Hence, this study was expected to have good power to address the primary hypotheses.

All study cases were analyzed as they were originally randomly assigned to study groups. Groups 2 and 3 were contrasted with group 1 on measures of adolescent-provider communication. The primary communication outcomes were dichotomous (yes or no): provider talked about alcohol use, provider asked about the adolescent’s alcohol use, adolescent asked provider a question about alcohol, adolescent asked provider a question of any type, and adolescent initiated discussion as well as answered questions. Logistic regression was used to assess whether the contrasts were significant after controlling for adolescent age, sex, and ethnicity. The repeated-measures option in PROC GENMOD of the SAS statistical software was used to account for correlation within providers, an approach based on generalized estimating equations. In these models, provider was included as a cluster variable to account for nonindependence among adolescents seen by a particular provider. Differences in the length of adolescent-provider discussions were assessed between contrasts using general linear mixed-model regression analyses (PROC MIXED, SAS). These models controlled for adolescent age, sex, ethnicity, and provider as a random covariate to account for nonindependence of adolescents seen by a provider.

To examine the success of randomization procedures, descriptive analysis compared adolescent characteristics between participants and nonparticipants and among study groups using χ² tests. A series of descriptive analyses contrasting groups 2 and 3 with group 1 were also conducted using adolescents as the unit of analysis without accounting for adolescent clustering within provider. The objective of this analysis was to examine adolescent perceptions at the exit interview as a preliminary analysis to the multivariate modeling described previously. Contrasts of adolescent-reported provider discussion about alcohol-related topics were examined using χ² analysis.

**RESULTS**

**PARTICIPATION**

Seven managed care organization group practices were initially asked to participate in the study, and 5 accepted. One practice (5 providers) specialized in family practice, and 4 practices (25 providers) specialized in pediatrics. Three of 30 primary care providers refused to participate in the study. One provider never saw a study adolescent during the study period. Hence, 26 providers participated. Study providers specialized 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 (mean±SD, 42.4±8.4 years), 20 were women, 13 were white, 9 were African American, 3 were Asian, 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, 17.1±15.9).

Ultimately, 1333 adolescents aged 12 through 17 years who were identified for the study received a general health checkup with one of the providers during the study period (Figure). Of 1333 adolescents, 441 were ineligible for the study. Hence, 892 adolescents met eligibility criteria. Of these, 445 adolescents did not participate because of refusals and logistical problems. The remaining 447 participated and were randomly assigned to a study group. The parent refusal rate was calculated as the number of verbal and passive refusals divided by the number of parents with whom there was telephone contact (208/843=24.7%). The participation rate for this study was calculated as the number of adolescents randomly assigned divided by the number of eligible adolescents (447/892≈50.1%). A comparison of participants and nonparticipants regarding adolescent age, sex, and state of residence and provider location did not reveal differences. The 447 participants were randomly selected...
assigned to study groups. Participation of 3 boys from group 2, aged 14, 15, and 16 years, was incomplete, leaving a study sample of 444.

**RANDOMIZATION AND INTERVENTION FIDELITY**

Random assignment produced 3 similar groups of adolescents based on comparisons of adolescents’ age, sex, state of residence, medical care site, history of seeing the same provider previously, and history of alcohol use (Table 1). Group 3 had fewer African American adolescents than did the other 2 study groups when ethnicity was dichotomized as African American vs other ($P \leq .02$).

All group 1 adolescents listened to a radio selection of their choice for 15 minutes before their visit. Almost all adolescents in group 2 (99.3%) and group 3 (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 3 (99.3%). Among group 3 adolescents, 86.7% reported at the exit interview that they saw their provider look at their alcohol risk self-assessment sheet. Some adolescents in group 1 (4.0%) and group 2 (7.5%) reported that their provider opened a brochure with them to discuss information about alcohol, whereas 41.5% of adolescents in group 3 reported this. Some adolescents in group 1 (13.3%) and group 2 (11.6%) reported that their providers gave them something to read about alcohol, whereas 66.0% of adolescents in group 3 reported this. When adolescents left the examination room, researchers observed that 67.3% of adolescents in group 3 were holding the study brochure about alcohol, it was left in the retrieved bag for 16.3% of adolescents, and the parent of 12.9% of adolescents was holding the brochure.

**ADOLESCENT-PROVIDER COMMUNICATION BY STUDY GROUP**

Comparisons of each intervention group with the usual care control group indicated that there was more provider discussion about all the alcohol topics in group 3 vs group 1 (Table 2). There were no differences in adolescent-reported provider discussion about alcohol between group 2 and group 1.

Further analysis of adolescent-reported data indicated that providers were more likely to talk about alcohol during group 3 than group 1 visits, but providers in group 3 visits were no more likely than providers in group 1 visits to ask adolescents about their alcohol use (Table 3). These analyses controlled for adolescent age, sex, and ethnicity as well as intraclass correlations due to multiple adolescents having been seen by a particular provider.

Adolescent self-reported data, which were analyzed controlling for adolescent age, sex, and ethnicity as well as adolescent clustering within a provider, indicated that adolescents in group 2 and group 3 were more likely to talk and ask questions during their health checkups than were adolescents in group 1 (Table 3). However, only adolescents in group 3 asked more questions specifically about alcohol than did group 1 adolescents. Based on researcher observation, the length of communication was greater during group 2 and 3 visits than during group 1 visits, although only group 3, not group 2, visits included more time without the parent present than in group 1 visits (Table 4).

**COMMENT**

Data from adolescent self-reports and researcher observations revealed that priming adolescents to talk with their provider about alcohol and prompting providers to talk with their adolescent patient about alcohol increased 2-way adolescent-provider communication about alcohol and may have increased communication about the adolescent’s personal alcohol-related behaviors. Priming adolescents alone may have had a general effect on increased adolescent questioning of providers and initiating discussion during the health care visit. This study suggests that, among families and providers who are members of managed care organizations and who are supportive of priming and prompting interventions, such interventions can improve adolescent-provider communication about sensitive topics, specifically alcohol use.

Adolescents who received only the audio priming intervention reported that they asked the provider more questions about topics not specific to alcohol and spent more time face-to-face with the provider than did ado-

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**Table 1. Characteristics of Study Adolescents by Study Group**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Group 1, Usual Care</th>
<th>Group 2, Audio Only</th>
<th>Group 3, Audio + Provider Prompting</th>
<th>$P$ Value†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Female</td>
<td>68 (45.3)</td>
<td>67 (45.6)</td>
<td>64 (43.5)</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>82 (54.7)</td>
<td>80 (54.4)</td>
<td>83 (56.5)</td>
</tr>
<tr>
<td>Age, y</td>
<td>12-13</td>
<td>55 (36.7)</td>
<td>65 (44.2)</td>
<td>49 (33.3)</td>
</tr>
<tr>
<td></td>
<td>14-15</td>
<td>52 (34.7)</td>
<td>42 (28.6)</td>
<td>51 (34.7)</td>
</tr>
<tr>
<td></td>
<td>16-17</td>
<td>43 (28.7)</td>
<td>40 (27.2)</td>
<td>47 (32.0)</td>
</tr>
<tr>
<td>Managed care organization site</td>
<td>A</td>
<td>2 (1.3)</td>
<td>3 (2.0)</td>
<td>1 (0.7)</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>80 (53.3)</td>
<td>75 (51.0)</td>
<td>80 (54.4)</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>33 (22.0)</td>
<td>28 (19.0)</td>
<td>27 (18.4)</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>19 (12.7)</td>
<td>24 (16.3)</td>
<td>22 (15.0)</td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>16 (10.7)</td>
<td>17 (11.6)</td>
<td>17 (11.6)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>African American</td>
<td>126 (84.0)</td>
<td>122 (83.0)</td>
<td>105 (71.4)</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>24 (16.0)</td>
<td>25 (17.0)</td>
<td>41 (27.9)</td>
</tr>
<tr>
<td>Saw provider before</td>
<td>Yes</td>
<td>72 (48.0)</td>
<td>57 (38.8)</td>
<td>70 (48.3)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>41 (27.3)</td>
<td>39 (26.5)</td>
<td>43 (29.7)</td>
</tr>
<tr>
<td></td>
<td>Not sure</td>
<td>37 (24.7)</td>
<td>51 (34.7)</td>
<td>32 (22.1)</td>
</tr>
<tr>
<td>Drank alcohol in last 30 days</td>
<td>Yes</td>
<td>22 (14.7)</td>
<td>23 (15.6)</td>
<td>29 (19.9)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>128 (85.3)</td>
<td>124 (84.4)</td>
<td>117 (80.1)</td>
</tr>
</tbody>
</table>

*Data are given as the number (percentage) of participants unless otherwise indicated.†$x^2$ analysis.
Adolescents who received the usual care. Hence, priming adolescents to talk to their provider during medical visits may increase adolescent communication in general. There was no evidence that priming alone increased adolescents’ questioning specifically about alcohol. Although priming may increase adolescents’ seeking of information, it may not overcome adolescent barriers to revealing personal information about sensitive behaviors.

Adolescents who received the priming and were seen by providers who were prompted to address their alcohol use reported that they asked more questions about alcohol and other topics and spent more time face-to-face with the provider than did adolescents who received the usual care. In fact, 80% of adolescents who received the priming intervention reported asking the provider a question compared with 60% of adolescents in the control group. Prior research indicates that provider discussion of a sensitive topic such as sex is associated with more adolescents saying they would be comfortable talking to the provider about the topic, and providers who facilitate active dialogue with adolescents through questions or statements designed to elicit responses have been shown to increase adolescent communication during medical visits. Hence, adolescent disclosure of personal information about sensitive behaviors may be contingent on provider communication that elicits adolescent communication.

Consistent with previous research, providers increased their discussion of alcohol when they were prompted to do so by the intervention materials placed on the examination room doorknob. Specifically, when providers received the bag on the doorknob, their ado-

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**Table 2. Percentage of Adolescents Who Reported That Their Primary Care Provider Talked About Alcohol-Related Topics During Their General Medical Care Check-up***

<table>
<thead>
<tr>
<th>Topic Discussed</th>
<th>Group 1, Usual Care (n=150)</th>
<th>Group 2, Audio Only (n=147)</th>
<th>P Value vs Group 1†</th>
<th>Group 3, Audio + Provider Prompting (n=147)</th>
<th>P Value vs Group 1†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoiding alcohol</td>
<td>76.0</td>
<td>73.5</td>
<td>.62</td>
<td>89.1</td>
<td>.003</td>
</tr>
<tr>
<td>Effects of alcohol on decisions</td>
<td>66.0</td>
<td>67.1</td>
<td>.54</td>
<td>86.4</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Resisting peer pressure to drink</td>
<td>66.4</td>
<td>60.3</td>
<td>.27</td>
<td>79.6</td>
<td>.01</td>
</tr>
<tr>
<td>Dangers of drinking and driving</td>
<td>58.7</td>
<td>56.8</td>
<td>.75</td>
<td>76.9</td>
<td>.001</td>
</tr>
<tr>
<td>Avoiding places where teenagers drink</td>
<td>50.0</td>
<td>53.4</td>
<td>.56</td>
<td>86.4</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Avoiding other teenagers when they are drinking</td>
<td>54.7</td>
<td>54.4</td>
<td>.97</td>
<td>77.6</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Risk of combining drinking and sex</td>
<td>52.7</td>
<td>59.2</td>
<td>.26</td>
<td>70.1</td>
<td>.002</td>
</tr>
</tbody>
</table>

*Data are presented as the percentage of participants, unless otherwise indicated.
†Contrast vs group 1 after controlling for age, sex, ethnicity, and provider in a generalized estimating equation logistic regression.

**Table 3. Types of Adolescent-Provider Communication as Reported by Adolescents at the Exit Interview, by Study Group***

<table>
<thead>
<tr>
<th>Type of Communication</th>
<th>Group 1, Usual Care</th>
<th>Group 2, Audio Only (OR (95% CI))†</th>
<th>Group 3, Audio + Provider Prompting (OR (95% CI))†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provider talked about alcohol-related topics</td>
<td>129 (86.6)/149</td>
<td>118 (81.9)/144 (0.96 (0.89-1.04))</td>
<td>141 (95.9)/147 (1.10 (1.04-1.17))§</td>
</tr>
<tr>
<td>Provider asked about adolescent’s alcohol use</td>
<td>100 (67.1)/149</td>
<td>88 (59.9)/147 (0.93 (0.85-1.02))</td>
<td>112 (76.2)/147 (1.09 (0.99-1.19))</td>
</tr>
<tr>
<td>Adolescent asked provider about alcohol</td>
<td>14 (9.5)/148</td>
<td>19 (12.9)/147 (1.03 (0.97-1.10))</td>
<td>26 (17.7)/147 (1.08 (1.00-1.16))§</td>
</tr>
<tr>
<td>Adolescent asked provider any questions</td>
<td>89 (59.7)/149</td>
<td>104 (71.2)/146 (1.13 (1.02-1.24))§</td>
<td>119 (80.3)/147 (1.23 (1.14-1.32))§</td>
</tr>
<tr>
<td>Adolescent responded to questions and initiated discussion</td>
<td>75 (50.0)/150</td>
<td>93 (63.3)/147 (1.15 (1.03-1.27))§</td>
<td>98 (68.7)/147 (1.15 (1.03-1.30))§</td>
</tr>
</tbody>
</table>

Abbreviations: CI, confidence interval; OR, odds ratio.
*Data are presented as the No. (%) of participants/the total No. of participants for that group and variable, unless otherwise indicated.
†Contrast vs group 1 after controlling for age, sex, ethnicity, and provider in a generalized estimating equation logistic regression.
‡P<.05.
§P<.005.

**Table 4. Length of Adolescent-Provider Communication as Observed by Researchers, by Study Group***

<table>
<thead>
<tr>
<th>Length of Communication</th>
<th>Group 1, Usual Care (n=150)</th>
<th>Group 2, Audio Only (n=147)</th>
<th>β (P Value)†</th>
<th>Group 3, Audio + Provider Prompting (n=147)</th>
<th>β (P Value)†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minutes teenager and provider spent face-to-face without parent</td>
<td>8.8 ± 8.0</td>
<td>8.3 ± 7.5</td>
<td>-0.2 (.76)</td>
<td>10.8 ± 7.6</td>
<td>1.7 (.03)</td>
</tr>
<tr>
<td>Total minutes teenager and provider spent face-to-face</td>
<td>19.2 ± 7.1</td>
<td>21.0 ± 7.3</td>
<td>1.8 (.04)</td>
<td>21.7 ± 7.8</td>
<td>2.5 (.004)</td>
</tr>
</tbody>
</table>

*Data are presented as mean ± SD unless otherwise indicated.
†Contrast vs group 1 after controlling for age, sex, ethnicity, and provider, in a general linear mixed-model regression.

Adolescent patients were more likely to report that the providers talked with them about alcohol, they spent more time face-to-face with the adolescents, and they spent more time alone with the adolescents without parents present. In this study, 96% of adolescents whose providers were prompted to talk about alcohol reported that their provider talked with them about alcohol, and 76% of such adolescents reported that their provider asked them about their alcohol use. This last rate for screening may underreport provider screening in this study when one considers that providers may not have always asked adolescents directly about their alcohol use when they were given the written risk assessment information; rather, they may have assumed the patient’s alcohol status from the risk assessment. Regardless, the rates at which providers addressed alcohol when prompted to do so in this study appear to be considerably higher than those reported in a recent national survey of providers3 and in a prior survey of similar adolescents in similar managed care group practices.13 In conclusion, prompting increased provider communication about alcohol with their adolescent patients.

The observation that adolescent communication about alcohol was contingent on provider communication about alcohol is particularly important, given other research showing variation in physician provision of information based on patient characteristics.26-28 This emphasizes the need for system-generated interventions, such as prompts, to reinforce provider discussion about alcohol with all adolescent patients.

Adolescents are often concerned about confidentiality regarding personal behaviors.17,29,30 Therefore, researchers encouraged providers to spend private time with all adolescents to discuss alcohol. Providers requested that researchers include a statement about adolescent-provider privacy in the research consent form to justify to parents asking them to leave the room. Provider prompting increased provider time alone with adolescents without the parent present.

The priming and prompting interventions increased the time providers spent with adolescents. Given that it is recommended that multiple priority health issues be addressed in adolescent general health checkups,1,4 even the mean of 22 minutes that adolescents and providers spent face-to-face in the intervention-related expanded visits might be considered brief. Previous research showed that provision of psychosocial counseling slightly lengthened visits.31 Although it increased visit length, the audio intervention was practical for use in busy medical offices. Multiple audio-players were easily stored and given to adolescents. They were relatively inexpensive, low-maintenance, familiar to adolescents, and easy to operate. The headset and answer sheets allowed for private administration. In addition, audio may be more reliable than written questionnaires.32

Creation of the audio program was laborious and expensive and involved focus groups, script development, studio rental, hiring production and sound managers, hiring actors and actresses, and purchasing music. Because student and faculty volunteers absorbed many costs, actual production costs were not determined.

There are a number of possible limitations to this study. Study adolescents may not be representative of all adolescents or adolescents in the managed care organizations. Data from the 2001 Youth Risk Behavior Survey suggest that younger, African American, and Washington, DC, adolescents have lower alcohol use rates than the average use rates for American adolescents.33 Hence, this sample may not reflect alcohol use patterns found in many other samples of adolescents nationally. Study adolescents were in families that had health insurance and that facilitated their research participation, were predominantly African American and constituted only 50% of adolescents eligible for the study. Although no differences were detected between eligible nonparticipants and study participants based on available variables, the low participation rate suggests the strong possibility that participants constitute a potentially biased sample. It is possible, for example, that adolescents who drank alcohol refused to participate, leading to a lower-risk adolescent sample. Also, given the high degree of logistical cooperation needed for the study, such as appearing early for the health checkups, higher-risk families may have been excluded. Such biases would decrease the risk of the sample and potentially decrease the family- and provider-perceived saliency of the study interventions. Such perceptions might decrease the effectiveness of the intervention on increasing adolescent-provider communication. It is also possible that the providers in this study were different from other primary care providers of adolescents. They were in managed care organizations, specialized in family practice or pediatrics, and were among colleagues who supported the research.

Finally, the experimental design could have reduced the differences in adolescent-provider communication observed among study groups. Randomization occurred at the adolescent level rather than the provider level, such that multiple adolescents seen by the same provider were randomized to 3 experimental conditions. Each provider was studied under all 3 study conditions. The effects of intraclass correlation of adolescent subjects seen by the same provider was controlled for in the analysis. Study contamination by providers learning from the intervention tools and transferring this learning to their communication in other study groups could not, however, be controlled. It is likely, therefore, that provider communication about alcohol was higher in study conditions that did not include provider prompting than would otherwise be expected. The evidence that contamination occurred is based on adolescent exit surveys about provider communication and past studies; the rate at which providers addressed alcohol in this study was somewhat higher in the control group than rates recently reported in the literature.5,13 Hence, the provider prompting probably had an even more pronounced effect relative to usual care than that observed.

Despite these possible limitations, the randomized, controlled design offers high internal validity, and the study findings warrant further investigation in other settings and patient populations.

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Primary care providers do not communicate with adolescents about the risks of alcohol use as often as is recommended. Adolescents are often not forthcoming about their concerns related to personal behaviors such as alcohol use. Providing recommendations to providers has not increased adolescent-provider communication to ideal levels. Studies on effective ways of increasing communication are needed.

This study demonstrates that priming the patient to communicate with the provider about alcohol and prompting the provider to communicate with the patient about alcohol significantly increases 2-way communication about alcohol. Hence, systems-level interventions directed at adolescent patients and their providers are promising ways of increasing adolescent-provider communication about sensitive issues.

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REFERENCES

27. Stewart M. Patient characteristics which are related to the doctor-patient interaction. Fam Pract. 1984;1:30-36.