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## Review of Clinical Trials Testing the Effectiveness of Physician Intervention Approaches to Prevention Alcohol-Related Problems in Adolescent Outpatients

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### Abstract

**Objective**—Conduct a review of clinical trials to identify effective approaches for improving physician provision of alcohol education and counseling services among outpatient adolescents.

**Methods**—Reviewed all peer-reviewed, published clinical trials identified through computerized searches evaluating alcohol education and counseling services to outpatient adolescents by physicians.

**Results**—Three trials were identified examining changes in physician provision of alcohol education and counseling services. One of the trials resulted in increased adolescent self-reported refusal skills, while another trial resulted in reduction of adolescent self-reported alcohol use and binge drinking. Seven trials were identified that compared physician with non-physician provision of alcohol education and counseling services. Four of the trials showed some reduction in adolescent self-reported alcohol use.

**Conclusion**—Trials indicate that further reduction in adolescent alcohol use is possible with non-physicians as interventionists and perhaps physicians as interventionists, if physicians are supported by patient counseling guides and resources. Opportunities for personalized, interactive adolescent education with goal setting appears key to intervention success. The physician role that is tested in most trials is confined to a single brief encounter with little attention to: development of physician skills, systems-level resources, the parental role, or the impact of incorporating prevention into an ongoing adolescent-physician relationship.

### INTRODUCTION

In 2003, about 75% of high school students from across the Nation reported consuming at least one drink of alcohol at least once in their lifetime [1]. Current alcohol use, defined as one or more drinks in the preceding 30 days of the survey, was reported by about 45% of students. Among current drinkers, 28% consumed at least five drinks in one sitting. It was also reported that 12% of students had driven a vehicle after drinking alcohol, and 30% of students had ridden in a vehicle with a driver who had been drinking [1]. The Department of Health and Human Services (DHHS) reported that alcohol abuse cost the United States approximately \$167 billion in 1995 [2]. Alcohol use is associated with the leading causes of death among adolescents: motor vehicle accidents, homicides, suicides, and drowning [2]. Alcohol use among adolescents is also associated with physical fights, academic and occupational problems, illegal behavior, risky sexual behaviors, as well as psychiatric and social problems [1].

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The American Medical Association, Guidelines for Adolescent Preventive Services (GAPS), recommends to clinicians that all adolescents receive, on an annual basis, assessment and guidance regarding alcohol use [3]. The American Academy of Pediatrics suggests that all pediatricians regularly discuss alcohol refusal skills, problem drinking, and alcohol-free activities with adolescents [4]. The United States Preventive Services (USPS) Task Force recommends screening all adolescent patients to detect problem drinking with a careful history of alcohol use and/or standard screening questionnaires. However, the USPS stated that there is insufficient evidence to determine whether alcohol behavior counseling interventions for adolescents should be recommended in all primary care offices [5].

A national survey of 907 pediatricians indicated that 24.3% counseled adolescents aged 6–12 years and 69.7% of pediatricians counseled adolescents aged 13–18 about their use of alcohol and drugs [6]. In another national survey, pediatricians reported screening significantly more 15–17 year olds (Mean=76.8%) than 11–14 year olds (Mean=53.0%) [7].

Barriers to physician screening and educating patients about alcohol use include lack of physician confidence in the effectiveness of intervention and treatment, perceived lack of time and training, not perceiving this as part of their jobs, difficulty in dealing with adolescent patients, and personal concerns about counseling adolescents about alcohol [8,9].

The purpose of this study was to conduct an extensive review of computerized literature databases to identify and assess the results of physician interventions to reduce risk associated with adolescent alcohol consumption. To be included in the review, the interventions had to focus on clinician screening, education, counseling, and or referral of adolescent patients to address alcohol use.

## METHODS

Controlled clinical trials eliminate many threats to internal validity present in many uncontrolled studies, and thereby, allow inference in regard to whether the observed effects are caused by the intervention [10,11]. A search for peer-reviewed, published clinical trials of physician interventions to improve outpatient alcohol assessment, education, risk reduction counseling, and referral among adolescents was conducted using the computer programs ERIC, MEDLINE and PsycINFO. Computer searches were limited to publications in English involving: clinical trials addressing physician provision of alcohol assessment, education, prevention, and referral; patient populations under 25 years old or with an average age no more than 25 years old, or including subgroup analyses of patients below 25 years old; and outpatient settings in the United States or other highly developed country. Studies including the adolescent and the physician as the units of analyses were included. Searches were not limited as to year of publication, and the earliest publication year of identified publications was 1999. Studies involving physicians-in-training were excluded. Key words used in searches included the following. Physician was searched using the words “physician”, “provider”, and “clinician”. Alcohol was searched with the words “alcohol” and “substance use”. Sample was searched using the words “adolescent”, “teen\*”, and “youth”. Risk assessment and risk reduction was searched with “risk assessment”, “risk reduction”, “alcohol use history”, “education”, “prevention”, “counseling”, “advice”, “training”, “intervention”, “randomized controlled trial”, and “referral”. Outpatient settings were searched with “office”, “clinic”, and “outpatient”. All retrieved abstracts were reviewed and all publications that clearly or possibly met the search limitations were retrieved in full. A final judgment about whether the article met the search criteria was made based on the full publication. The reference lists of retrieved publications were also searched for titles of publications that possibly met the selection criteria and, once retrieved in full, these publications were also reviewed to determine whether they met the selection criteria.

Of these articles, articles that involved a physician as an interventionist either in a control or experimental group were retained for further analysis.

Of the original publications identified using the search techniques, five were excluded because they contained no patient outcomes [12–16], two were excluded because they were qualitative studies [17,18], seven were excluded because the sample was too old [19–25], eight were not clinical interventions [7,26–32], and three studies did not include the physician as an interventionist [29,33,34]. The search resulted in ten publications that met the search criteria. Those trials were then reviewed and the following aspects of the trials were retrieved: setting and target population, study sample, study design and conditions, intervention characteristics, physician behavior change or fidelity to the intervention (when physicians were the experimental interventionists), adolescent outcomes, and authors' observed limitations of the trial.

Upon review of the ten publications that met the search criteria, it was discovered that they could be examined in an additional way. Three of the trials utilized physicians in both the experimental and control conditions. The remaining seven trials only utilized non-physicians (nurses, research staff) as the experimental interventionists and utilized physicians for the control condition. The analyses are presented in Tables 1 and 2.

## RESULTS

### **Trials to Improve Physician Provision of Alcohol Use Prevention Services with Adolescent Outpatients**

**Settings & Study Population**—Outpatient settings of the trials included primary care group practices [35–37] (Table 1). All three of the trials were conducted in the United States [35–37].

The adolescent participants ranged in age from ten [37] to 30 years [36]. All three trials included both males and females. Of those two trials with ethnic composition reported [35,36], only one trial included a majority African-American sample [35], and the other trial included a majority White sample [36]. One trial included family units as the study population [37]. The trial sample sizes ranged from 226 [36] to 3145 [37]. The total sample size of the three trials was 3780 patients and 118 physicians [35–37]. Of the two trials which reported physician sample size, only one trial reported the characteristics of the clinicians [35].

**Study Methods**—All three trials were randomized controlled trials, with all adolescent participants being randomly assigned to conditions. The Boekeloo et al. [35] and Grossberg et al. [36] trials included a usual or standard care condition, while the Stevens et al. [37] trial included counseling and education on different health behaviors as the comparison condition. The length of the intervention conditions in the three trials was variable, and ranged from at least 10 minutes [36] to unspecified periods of time to educate/counsel the adolescent [35,37]. The outcome data collection periods ranged from six month [35,36] to forty-eight month [36] follow-up. The experimental conditions included: audio self-assessment with clinician counseling [35], clinician delivered risk reduction counseling with skills building [36], and clinician individualized counseling [37]. Two of the three trials reported some measure of clinician fidelity [35,37].

**Study Outcomes**—No trial measured changes in adolescent knowledge or attitudes. None of the trials included or reported any referral outcomes for problem drinkers. However, all trials reported some measure of adolescent behavior change. All three of the trials included a measure of alcohol quantity and frequency. One of the three trials which reported

differences in alcohol use reported that, when compared to the usual care group, those in the experimental group were twice as likely to refuse alcohol at follow-up [35]. One trial reported that those in the experimental group, when compared to the usual care group, consumed less alcohol and binged less at follow-up [36]. Of particular note, this same trial also reported that those in the experimental group, when compared to the usual care group, were also less likely to have emergency department visits, nonfatal motor vehicle accidents, and liquor violations at follow-up [36]. Two trials reported that the experimental intervention increased self-reported alcohol use at follow-up [35,37].

**Critique of the Trials**—Physician fidelity was only reported in one trial [35]. A particular strength of one of the trials was that the researchers monitored adolescent self-reported alcohol behaviors using multiple measures. Grossberg, Brown and Fleming attempted to verify the adolescent's self-reported alcohol use by interviewing a member of the adolescent's family at the 12-month follow-up, and they also utilized information from the Department of Transportation, the Crime Information Bureau, and health care claims at the 48-month follow up to determine any consequence as a result of the adolescent's alcohol use [36].

### **Trials Comparing Physician to Non-Physician Provision of Alcohol Use Prevention Services with Adolescent Outpatients**

**Settings & Study Population**—Outpatient settings of the trials included: five hospital emergency departments [38–42], an oral clinic [43], and a general practice [44] (Table 2). Four of the trials were conducted in the United States [38,39,41,42], one in Australia [40], and two in England [43,44].

The adolescent participants' ages ranged from 12 [40,42] to 35 years [43]. Six trials included both males and females [38–42,44], and one trial included male adolescent participants only [43]. Of those three trials with ethnic composition reported [39,41,44], no trial included a majority African-American sample with all three trials including a majority White sample [39,41,44]. The trial sample sizes ranged from 94 [41] to 1,488 [44]. The total sample size of the seven trials was 3,298 patients. Only one study reported the sample size of interventionists (2 senior nurses) [43], and no trial reported interventionist or physician characteristics.

**Study Methods**—All seven trials were randomized controlled trials, with all adolescent participants being randomly assigned to conditions. All of the trials included a usual or standard care condition. The reported length of the intervention conditions in the seven trials ranged from 20 minutes [44,42] to 35 minutes [39], however, the other four trials left unspecified the variable duration of intervention sessions. The follow-up periods ranged from three months [38,39,41–44] to twelve months [38,39,43,44]. The experimental conditions included: interactive laptop-based program [38], motivational interviewing [39,41–43], and individualized counseling [40,44]. Three of the seven trials reported some measure of clinician fidelity [39,41,43].

**Study Outcomes**—No trial measured changes in adolescent knowledge or attitudes. None of the trials included or reported any referral outcomes for problem drinkers. However, all trials reported some measure of adolescent behavior change due to the intervention effect. Of the six trials that included alcohol use outcomes, three trials reported that those in the experimental group, when compared to the usual care group, consumed less alcohol [38,39,43]; and two of these trials reported that those in the experimental group, when compared to the usual care group, were less likely to binge [38,39]. Two trials reported no significant changes in adolescent behavior when comparing the experimental and control

groups [42,44]. Of the two trials including a drinking and driving outcome, only one trial reported that those in the experimental group, when compared to those in the usual care group, were less likely to drive after drinking and less likely to suffer alcohol-related injuries [41].

**Critique of the Trials**—Limitations of the reviewed trials include the lack of description of the clinician sample that delivered the clinical care and a description of the clinician sample's external validity. Clinician fidelity was not addressed in any of the seven trials. A strength of two of the trials was that self-reported alcohol behaviors were also assessed using other types of measures. Johnston et al. reviewed medical records of study adolescents to verify any injury sustained as a result of alcohol use during the follow up period [42]. Monti et al. retrieved data for licensed drivers from the Department of Motor Vehicles during the follow up period to identify any traffic consequence as a result of alcohol use [41].

## DISCUSSION

Do trials show that physicians can improve their effectiveness in reducing alcohol use among adolescents? This examination identified only three trials that evaluate physician interventions to reduce alcohol use in adolescent outpatients. Only one trial shows that brief physician intervention, in this case with a subset of adolescents that are moderate alcohol users, decreases alcohol consumption [36]. This trial also shows that measures of emergency department visits, non-fatal motor accidents, and other liquor violations are all reduced with the intervention. Although the physician intervention in the trial is brief, it includes interactive behavioral strategies including a contract with the adolescent about treatment plans and cognitive behavioral exercises. These findings are very encouraging in that they suggest physicians can reduce adolescent alcohol use and alcohol problems among drinkers. Another trial that repeats these findings would help to confirm the benefits of this approach. Also, research is needed to determine whether such brief intervention with adolescent non- and infrequent-drinkers reduces future heavy drinking and drinking problems.

Two of the three trials actually show that brief physician interventions increase adolescent self-reported alcohol use [35,37]. The adolescents in these trials are all adolescents receiving general health examinations and this repeated finding is certainly worrisome. The finding may, however, be an artifact of adolescent self-report. In general, adolescent self-reported alcohol use in surveys is believed to be reliable and valid, and is therefore a common method of measurement in adolescent research [1]. The reliability of self-reported measures has been found to be variable, however, and a source of concern in longitudinal and biomarker verification studies [45,46]. Perhaps adolescents that receive focused discussion about alcohol as part of their health care are more open about their alcohol use in research surveys. Alternatively, perhaps such physician intervention with both alcohol users and non-users has a helpful impact on current users but not current non-users.

Seven identified trials use physicians only in the usual care control condition, not in the experimental condition as interventionists. These trials include clinical staff or research assistants as the study interventionists and they tend to address samples of adolescents with high likelihood of alcohol problems, such as those being seen for injuries in emergency departments. In general, the results are encouraging and show that non-physician interventionists can decrease alcohol use and problems using personalized education and counseling, and goal setting [38,39,41,43]. The results are variable, however, and suggest the need for further examination of the impact of this behaviorally-focused type of intervention with non-injury patients, infrequent alcohol users, younger versus older

adolescents, and over various follow-up time points to assess short- and longer-term adolescent behavior change.

Overall, trials that report success in reducing adolescent alcohol use tend to share some common elements. Most importantly, they include interactive educational opportunities for adolescents to assess their own risks and develop personalized, realistic plans for self protection that address barriers to change. Motivational interviewing with some component of skill building or goal setting has been a successful framework in some of the alcohol risk reduction trials among adolescent outpatients. These approaches might be best characterized under the theoretical rubric of Social Cognitive Theory which posits that behavior change can result from heightened self-efficacy through various active and interactive modes of learning [47]. Information and advice given to adolescents as passive learners, with lack of elicitation of adolescent skill-building and commitment to change, is unlikely to impact adolescent alcohol use patterns.

Typical educational approaches used by busy physicians in time-restricted visits are limited by the barriers described at the beginning of this report, and may not include interactive opportunities for skill-building. Future research and physician guideline development should examine realistic physician roles and responsibilities in adolescent alcohol risk reduction and prevention, and incorporate educational resources that can enhance physicians' approaches to intervention.

Most of the trials performed to date use physicians for limited patient interactions that require limited amounts of physician time. The trials to reduce adolescent problems from alcohol often attempt to build on brief physician interactions with adolescents by using ancillary staff. These studies limit exploration of different possibilities for physician involvement in reducing or preventing adolescent alcohol use, and physician alcohol intervention is often set up by design in the trials to be less effective than the experimental intervention condition. Although it may be possible in some settings to defer alcohol education to non-physicians, the primary, and often only, educational interaction that adolescents have in their health care is with their physician. Furthermore, physicians' professional practice guidelines are written assuming the physician is the interventionist rather than ancillary staff.

There are a number of possible limitations of this literature review. Experts in literature retrieval have documented the limitations of computer literature searches including incomplete search databases, complexity and difficulty of ascertaining the most effective search algorithms, imperfect index terms, and publication bias toward statistically significant findings [48]. Although the authors used multiple peer-reviewed literature search strategies and attempted to exhaust all computer search options, it is possible that relevant trials were not identified. Furthermore, relevant intervention trials may not be published in the peer reviewed literature or indexed by the computer databases that were used, and thus, these trials may not be included in this literature review. Finally, the authors attempted to extract only information that was available in the publications and made no attempt to reassess the quality of the analytical findings or clarify information with the publications' authors. Hence, the review is limited to the information that the authors' were able to find in the articles.

## CONCLUSION

There are a limited number of trials to reduce outpatient adolescent alcohol use, particularly with physicians as the primary interventionist, to make strong conclusions about physician efficacy in reducing adolescent alcohol risk-taking. The physician role that is tested in most

trials is confined to a single brief encounter with little attention to: development of physician skills, systems-level resources, the parental role, or the impact of incorporating prevention into an ongoing adolescent-physician relationship. Reliance on adolescent self-report measures is also a major limitation of many existing trials. The results of trials are variable and suggest the need for further examination of the impact of behaviorally-focused intervention with non-injury patients, infrequent alcohol users, younger versus older adolescents, and over various follow-up time points to assess short- and longer-term adolescent behavior change.

Overall, taking all trials into consideration, it appears that reduction in outpatient adolescent alcohol use and some related behaviors is possible with non-physicians as interventionists and perhaps physicians as interventionists, if physicians are supported by patient counseling guides and resources. Opportunities for personalized, interactive adolescent education with goal setting appears key to intervention success.

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**Table 1**  
Trials to Improve Physician Provision of Alcohol Use Prevention Services with Adolescent Outpatients

Citation	Setting and Target Population	Study Sample	Study Design and Conditions	Experimental Intervention	Clinician Behavior Change or Fidelity	Adolescent Outcomes	Authors' Observed Limitations
Boekeloo, Jerry, Lee-Ongo, Worrell, Hamburger, Russek-Cohen, & Snyder, 2004 [35]	Setting: Managed care organization primary care group practices Sample Frame: English speaking, adolescents receiving a general health examination (892 eligible) Location: Washington, DC & Maryland metro area	<i>Number Participants:</i> 26 physicians; 409 adolescent patients <i>Participant Characteristics:</i> 35% African American 77% Female; 50% White; 79% African American Adolescents: 56% Female; 79% African American Age range: 12–17 years	<i>Design:</i> Randomized Controlled Trial (RCT) with 6 and 12 month follow up <i>Conditions:</i> 1) Usual care plus 15 minutes of listening to radio of choice 2) 15 minute audio program with self-assessment and general health examination 3) Same as Group 2 and researchers placed study brochure, adolescent self-assessment answer sheet, and self-assessment template in bag on examination room door for physicians' use.	<i>Interventionist:</i> 1) Physician 2) Physician <i>Format:</i> 1) Individual 2) Individual <i>Length:</i> >15 minutes >15 minutes >15 minutes	It was reported that 86.7% of adolescents in Group 3 saw their physicians look at their alcohol risk assessments. 41.5% of adolescents in Group 3 reported that their physician had discussed the brochure information with them, and 66% of the same adolescents reported that their physician had given them information about alcohol.	<i>Knowledge/Attitudes:</i> Behaviors: Group 3 adolescents were significantly more likely (odds ratio 2.08) to refuse alcohol at 6 month follow up. However, Groups 2 and 3 were also at least 3 times as likely to have binged within the previous 3 months at the 6 month follow up. At 12 month follow up, Groups 2 and 3 were again at least 3 times as likely to have binged in the previous 3 months.	Potential limitations included reliance on self-report data, dissimilarity of the study groups, and potential for more honest reporting by intervention adolescents.
Grossberg, Brown, & Fleming, 2004 [36]	Setting: 17 primary care clinics Sample Frame: Patients were approached by a receptionist and asked to complete the Health Screening Survey. Male patients who drank more than 14 drinks per week and female patients who drank more than 11 drinks per week were then contacted by research staff and invited to participate in the study (850 eligible). Location: southern Wisconsin	<i>Number Participants:</i> 226 patients <i>Participant Characteristics:</i> Physicians: 64 full-time family physicians and internists Adolescents: 51% female; 86% White, 5% African American; 53% aged 18–25, 47% aged 26–30;	<i>Design:</i> RCT with 6, 12, 24, 36, and 48 month follow up. <i>Conditions:</i> Patients randomized to: 1) Usual care 2) Brief intervention in which physician used a scripted workbook to review alcohol-related health effects, frequency of at-risk drinkers, methods to cut down on drinking, a treatment contract, and cognitive behavioral exercises.	<i>Interventionist:</i> 1) Physician 2) Physician <i>Format:</i> 1) Individual 2) Individual <i>Length:</i> 1) variable 2) 10–15 minutes per session	No data on physician fidelity was reported.	<i>Knowledge/Attitudes:</i> Behaviors: At the 6 month follow up, patients in the experimental condition significantly decreased their weekly alcohol consumption (42%). Weekly consumption between the 2 groups remained significantly different at 12, 24, and 36 month follow up periods as well. The patients in the experimental condition also experienced significantly less binge drinking episodes at 6, 12, and 48 month follow up periods when compared to the patients in the usual care condition (resulting in a difference of at least 15%). Those patients in the experimental condition also experienced significantly less emergency department visits, nonfatal motor vehicle	Potential limitations included the use of a brief intervention and the reliance on self-report data.

Citation	Setting and Target Population	Study Sample	Study Design and Conditions	Experimental Intervention	Clinician Behavior Change or Fidelity	Adolescent Outcomes	Authors' Observed Limitations
Stevens, Olson, Gaffney, Tosteson, Mott, & Starr, 2002 [37]	<p><i>Setting:</i> 12 pediatric primary care practices</p> <p><i>Sample Frame:</i> Families with 5th or 6th grade students attending scheduled health supervision visits (3496 eligible).</p> <p><i>Location:</i> Massachusetts, Vermont, and New Hampshire</p>	<p><i>Number Participants:</i> 92 physicians and nurse practitioners; 3145 families</p> <p><i>Participant Characteristics:</i></p> <p>Adolescents: Mean age: 11 years; 48% female; 57.6% had a family income of at least \$50,000</p>	<p><i>Design:</i> RCT with 12, 24, and 36 month follow up</p> <p><i>Conditions:</i></p> <ol style="list-style-type: none"> <li>1) Alcohol and tobacco use counseling and education.</li> <li>2) Gun safety, bicycle helmet use, and seatbelt use counseling and education.</li> </ol> <p>In both groups, all participants signed contracts to discuss the health issues and received a physician-signed agreement, a refrigerator magnet, and periodical newsletters.</p>	<p><i>Interventionist</i></p> <ol style="list-style-type: none"> <li>1) Physician</li> <li>2) Physician</li> </ol> <p><i>Format:</i></p> <ol style="list-style-type: none"> <li>1) Family</li> <li>2) Family</li> </ol> <p><i>Length:</i></p> <ol style="list-style-type: none"> <li>1) variable</li> <li>2) variable</li> </ol>	Physician fidelity was determined by chart audit, calls, and routine visits from research coordinators. It was reported that the intervention was implemented as planned.	<p>accidents, and liquor violations than those in the usual care condition.</p> <p><i>Knowledge/Attitudes Behaviors:</i> A moderate increase in alcohol consumption was reported for adolescents in group 1 at 24 and 36 months (odds ratio of 1.27 and 1.30 respectively).</p>	Potential limitations included the focus on many health behaviors, no true control group, and reliance on self-report data.

**Table 2**  
Trials Comparing Physician to Non-Physician Provision of Alcohol Use Prevention Services with Adolescent Outpatients.

Citation	Setting and Target Population	Study Sample	Study Design and Conditions	Experimental Intervention	Clinician Behavior Change or Fidelity	Adolescent Outcomes	Authors' Observed Limitations
Maio, Shope, Blow, Gregor, Zakrajsek, Weber, & Nypaver, 2005 [38]	<i>Setting:</i> Hospital emergency department <i>Sample Frame:</i> Non-intoxicated adolescents aged 14–18 with an acute minor injury whose parent/guardian was present to consent (843 eligible). <i>Location:</i> Ann Arbor, Michigan and Flint, Michigan	<i>Number Participants:</i> 655 adolescent patients <i>Characteristics:</i> Adolescents: Age range: 14–18 years; Mean age: 15.9 years (SD 1.5 years); 66% Male	<i>Design:</i> RCT with 3 and 12 month follow up <i>Conditions:</i> 1) Usual care 2) Usual care plus laptop-based interactive program addressing alcohol misuse	<i>Interventionist:</i> 1) Physician 2) Research assistant <i>Format:</i> 1) Individual 2) Individual <i>Length:</i> 1) Variable 2) Not reported	No data on physician fidelity was reported.	<i>Knowledge/Attitudes:</i> Those adolescents in the intervention group reported significantly less alcohol misuse and binge drinking at the 3 month follow up when compared to the control group. At the 12 month follow up, there were no significant differences among the two groups' alcohol misuse and binge drinking.	Potential limitations included narrow recruitment time frame, reliance on self-report data, difference in data collection methods (computer at baseline and telephone at follow up), and difference of drop-out behaviors.
Spirito, Monti, Barnett, Colby, Snidelaar, Robsenow, Lewander, & Myers, 2004 [39]	<i>Setting:</i> Urban hospital emergency departments <i>Sample Frame:</i> English speaking, non-suicidal adolescents aged 13–17 with injury suffered while under influence of alcohol (287 eligible) <i>Location:</i> Northeast United States	<i>Number Participants:</i> 152 adolescents <i>Participant Characteristics:</i> Adolescents: 64% Male; Mean age: 15.6 (SD of 1.2 years); 72% White; 17% Hispanic	<i>Design:</i> RCT with 3, 6, and 12 month follow up <i>Conditions:</i> 1) Standard care with a handout on avoiding drinking and driving. 2) Motivational interviewing with personalized education, counseling, and goal setting along with the handout to avoid drinking and driving.	<i>Interventionist:</i> 1) Physician 2) Research staff <i>Format:</i> 1) Individual 2) Individual <i>Length:</i> 1) 5 minutes 2) 35 to 45 minutes	Adherence to the study guidelines by research staff was measured by having interventionists and patients complete questionnaires to rate the delivery and utility of the protocol. Novice interventionists were also videotaped throughout the study.	<i>Knowledge/Attitudes:</i> Those adolescents in Group 2 with high alcohol involvement reported significantly less drinking days per month and significantly less high-volume drinking days when compared to those adolescents in Group 1 at each of the follow up periods.	Potential limitations included the high refusal rate, reliance on self-report data, and the difficulty in following up with school drop-outs.
Tait, Hulse, & Robertson, 2004 [40]	<i>Setting:</i> Hospital emergency departments <i>Sample Frame:</i> Adolescents aged 12–19 years with an alcohol or other drug health issue (184 eligible) <i>Location:</i> Perth, Australia	<i>Number Participants:</i> 127 adolescents <i>Participant Characteristics:</i> Adolescents: Mean age: 16.7 (SD of 1.8 years); 55% Males	<i>Design:</i> RCT with 4 month follow up <i>Conditions:</i> 1) Usual care 2) Referral to external treatment agency, individualized sessions with interventionist to discuss treatment barriers, and vehicle and/or financial assistance to referral.	<i>Interventionist:</i> 1) Physician 2) Research staff <i>Format:</i> 1) Individual 2) Individual <i>Length:</i> 1) Variable 2) Variable	No data on fidelity was reported.	<i>Knowledge/Attitudes:</i> Significantly more adolescents in Group 2 sought treatment at a community treatment agency. Among those seeking treatment, there was a reduction in drug consumption. Those adolescents in Group 2 also showed significant improvements in psychological well-being at follow up when compared to those adolescents in Group 1.	Potential limitations included the lack of definitive diagnoses of substance dependence, the reliance of self-report data, inability to blind interviewers, limited recruitment time frame, and attrition at follow-up.

Citation	Setting and Target Population	Study Sample	Study Design and Conditions	Experimental Intervention	Clinician Behavior Change or Fidelity	Adolescent Outcomes	Authors' Observed Limitations
Smith, Hodgson, Bridgeman, & Shepherd, 2003 [43]	<i>Setting:</i> Oral and maxillofacial outpatient clinics <i>Sample Frame:</i> Males aged 16–35 attending a clinic with a facial injury (219 eligible). <i>Location:</i> Cardiff, United Kingdom	<i>Number Participants:</i> 2 senior general nurses; 151 male patients <i>Participant Characteristics:</i> Patients: Mean age: 24	<i>Design:</i> RCT with 3 and 12 month follow up <i>Conditions:</i> 1) Usual care 2) Motivational interviewing consisting of topics such as alcohol consumption, agenda-setting, motivation to change, information provision, and assistance with decision making.	<i>Interventionist:</i> 1) Physician 2) Nurse <i>Format:</i> 1) Individual 2) Individual <i>Length:</i> 1) variable 2) variable	It was reported that both nurse therapists adhered to the intervention protocol as determined by tape-recorded sessions.	<i>Knowledge/Attitudes:</i> <i>Behaviors:</i> At 3 and 12 month follow ups, those males in the intervention group reported significantly less consumption of alcohol in a typical week. Also at 12 months, the percentage of hazardous drinkers as determined by AUDIT decreased from 95% to 58% in the intervention group and only 96% to 81% for the control group.	Potential limitations included the use of self-report data, reliance on standardized questionnaire assessments, and a potential motivational bias in the nurses.
Walker, Townsend, Oakley, Donovan, Smith, Hurst, Bell, & Marshall, 2002 [44]	<i>Setting:</i> General practice registers <i>Sample Frame:</i> Adolescents aged 14 or 15 who were patients of the clinics (1516 eligible). <i>Location:</i> Hertfordshire, England	<i>Number Participants:</i> 1488 adolescents <i>Participant Characteristics:</i> Adolescents: Mean age: 14.8 (range 14–16); 51% Female; 89% White	<i>Design:</i> RCT with 3 and 12 month follow up <i>Conditions:</i> 1) Usual care 2) Adolescents received an appointment to meet with a practice nurse to discuss any health related topic.	<i>Interventionist:</i> 1) Physician 2) Nurses <i>Format:</i> 1) Individual 2) Individual <i>Length:</i> 1) Variable 2) 20 minutes	No data on physician fidelity was reported.	<i>Knowledge/Attitudes:</i> <i>Behaviors:</i> Only 8% wanted to discuss alcohol related health issues. There were no significant changes in adolescent drinking at 3 or 12 month follow-up.	Potential limitations included limited external validity, reliance on self-report data, the brief nature of the study, and the ability of adolescents to choose their primary health concern.
Johnston, Rivara, Droesch, Dunn, & Copass, 2002 [42]	<i>Setting:</i> Urban emergency department <i>Sample Frame:</i> Sober, English speaking, coherent adolescents between the ages of 12 and 20 with an injury. <i>Location:</i> Pacific Northwest, United States	<i>Number Participants:</i> 631 adolescent patients <i>Participant Characteristics:</i> Adolescents: Mean age: 16.4; 65.2% male	<i>Design:</i> RCT with 3 and 6 month follow up <i>Conditions:</i> 1) Usual care 2) Adolescents received a 20-minute behavior change counseling session based on a risk behavior they self-reported in their baseline analysis.	<i>Interventionist:</i> 1) Physician 2) Master's level social workers <i>Format:</i> 1) Individual 2) Individual <i>Length:</i> 1) Variable 2) 20 minutes	No data on physician fidelity was reported.	<i>Knowledge/Attitudes:</i> <i>Behaviors:</i> No significant behavior changes were reported for adolescents regarding driving after drinking, riding with an impaired driver, or binge drinking.	The limitations of this study included the inclusion of adolescents without an injury-related risk behavior resulting in difficulty detecting change, timing of the recruitment period (nights only), reliance on self-report data, and the inclusion of older adolescents.
Monti, Spirito, Myers, Colby, Barnett, Robsenow, Woolard, & Lewander, 1999 [41]	<i>Setting:</i> Hospital Emergency rooms <i>Sample Frame:</i> English speaking, non-suicidal adolescents with injury suffered while under influence of alcohol (184 eligibles)	<i>Number Participants:</i> 94 adolescent patients <i>Participant Characteristics:</i> Adolescents: Mean age: 18.4 (SD of .5 years); 64% male;	<i>Design:</i> RCT with 3 and 6 month follow up <i>Conditions:</i> 1) Usual care with a handout on avoiding drinking and driving and a list of local treatment agencies 2) Motivational interviewing with	<i>Interventionist:</i> 1) Physician 2) Research staff <i>Format:</i> 1) Individual 2) Individual <i>Length:</i> 1) Variable 2) Variable	Adherence to the study guidelines by research staff was measured by having interventionists and patients complete questionnaires to rate the delivery and utility of the	<i>Knowledge/Attitudes:</i> <i>Behaviors:</i> Those adolescents in Group 2 were less likely to have had a moving violation (20% difference), 4 times less likely to drink and drive, and suffer from alcohol-related injuries and other problems (29% difference) when compared to those in Group 1	Potential limitations included the specific population used, the high refusal rate, use of self reported data, and the use of a proactive recruitment strategy.

Citation	Setting and Target Population	Study Sample	Study Design and Conditions	Experimental Intervention	Clinician Behavior Change or Fidelity	Adolescent Outcomes	Authors' Observed Limitations
	<i>Location:</i> Northeast United States.	80% White; 13% African American	personalized and computerized assessment feedback and goal setting activities and handouts.		protocol. Novice interventionists were also videotaped throughout the study. It was reported from both the patients and providers that the essential elements of the intervention were utilized at least 88% of the time. Both parties also agreed that rapport, empathy, and self-efficacy enhancement were all high.	at 3 and 6 month follow up.	