Identification, Prevention and Treatment: A Review of Individual-Focused Strategies to Reduce Problematic Alcohol Consumption by College Students*

MARY E. LARIMER, PH.D.† AND JESSICA M. CRONCE, B.S.†

Department of Psychiatry and Behavioral Sciences, Box 356560, University of Washington, Seattle, Washington 98195

ABSTRACT. *Objective:* The purpose of this article is to review and assess the existing body of literature on individually focused prevention and treatment approaches for college student drinking. *Method:* Studies that evaluate the overall efficacy of an approach by measuring behavioral outcomes such as reductions in alcohol use and associated negative consequences were included. All studies discussed utilized at least one outcome measure focused on behavioral change and included a control or comparison condition; however, not all trials were randomized. *Results:* Consistent with the results of previous reviews, little evidence exists for the utility of educational or awareness programs. Cognitive-behavioral skills-based interventions and brief motivational feedback (including mailed graphic feedback) have consistently yielded greater support for their efficacy than have informational interventions. *Conclusions:* There is mixed support for values clarification and normative reeducation approaches. Much of the research suffers from serious methodological limitations. The evidence from this review suggests that campuses would best serve the student population by implementing brief, motivational or skills-based interventions, targeting high-risk students identified either through brief screening in health care centers or other campus settings or through membership in an identified risk group (e.g., freshmen, Greek organization members, athletes, mandated students). More research is needed to determine effective strategies for identifying, recruiting and retaining students in efficacious individually focused prevention services, and research on mandated student prevention services is an urgent priority. Integration between campus policies and individually oriented prevention approaches is recommended. (*J. Stud. Alcohol,* Supplement No. 14: 148-163, 2002)

THIS ARTICLE presents a review of the literature on individually focused prevention (including universal, indicated and selective prevention targets) and treatment approaches for college student drinking. Also included is a review of strategies for identifying individuals in need of prevention or treatment services and enhancing recruitment and retention of students in these services. Studies that evaluate overall efficacy of prevention and treatment approaches are included, as well as the available research on the effectiveness of these approaches with identified subgroups of students who are at high risk for problematic alcohol use (including children of alcoholics, fraternity/sorority members, freshmen, judicially mandated students and athletes). The behavioral outcomes used to evaluate program efficacy include reductions in alcohol use (including quantity, frequency and intensity of use), reductions in the negative consequences of use (in conjunction with or independent of use reduction) and/or increased rates of alcohol abstinence.

The relevant literature was identified through online searches of electronic databases, including MEDLINE, PsychInfo and ETOH as well as examining reference sections from previous reviews of prevention literature (Hingson et al., 1997; Maddock, 1999; Moskowitz, 1989; Walters, 2000; Wood, 1998) and the outcome studies identified through these searches. Studies from the 15-year period of 1984-1999 are included. In addition, the *Promising Practices: Campus Alcohol Strategies* sourcebook (Anderson and Milgram, 1997, 1998) was reviewed, and several sources were identified and contacted for information about outcome evaluations of their programs. Finally, authors who were identified through these searches and/or through other contacts within the field (including Fund for the Improvement of Postsecondary Education grant recipients) who are known to conduct research in this area were contacted to request reprints or preprints of their work relevant to this topic. The resulting review thus contains both published and unpublished studies.

It should be noted that, although there is a growing body of literature on prevention of problem drinking among college students, and the majority of approaches have been individually focused, there are still relatively few randomized, controlled trials of these approaches in the published literature. Therefore, although these few trials are heavily weighted in the review, nonrandomized trials were also included. Inclusion criteria were that, at a minimum, studies

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†Mary E. Larimer may be reached at the above address or via email at: larimer@u.washington.edu. Jessica M. Cronce is with the Addictive Behaviors Research Center, Department of Psychology, University of Washington.

must have a control or comparison condition, and studies must include at least one outcome measure focused on behavioral change in drinking or consequences (instead of or in addition to typical attitudinal or knowledge-based outcomes alone). Finally, in general, nonrandomized studies were included only if they employed pre- and post-assessments, allowing for statistical control or evaluation of baseline differences between groups. These criteria are similar to those employed by Wood (1998) in his review of this literature.

Prevention and Treatment Strategies

A variety of prevention and treatment approaches have been employed with college student drinkers. Although many of these are multicomponent strategies, for the purposes of this review, prevention programs have been divided, based on content and theory of the approach, into three major categories: (1) educational/awareness, (2) cognitive-behavioral and (3) motivational enhancement techniques. Table 1 lists the prevention programs covered in this review, including design and outcome information.

Educational/awareness programs

In his 1989 review of the literature on effectiveness of alcohol prevention strategies for adolescents, Moskowitz concluded that the majority of prevention approaches utilized with college students were based on weak or nonexistent theory and had virtually no empirical support for their efficacy. At that time, the most common approaches were informational in nature. They were primarily based on the assumption that students misused alcohol or other substances due to a lack of knowledge or awareness of health risks and that an increase in knowledge regarding the negative effects of these substances would lead to a decrease in use. Research evaluations of these approaches have tended to suffer from a number of methodological limitations, particularly small sample sizes, nonrandom samples and often lack of or noncomparability of control or comparison conditions. Despite these weaknesses, informational/educational approaches are still the most commonly utilized techniques for individually focused prevention on college campuses (Ziemelis, 1998).

Three relatively distinct types of educational programs have been evaluated with college students: (1) traditional information or knowledge-based programs; (2) values clarification programs, designed to help students evaluate their goals and incorporate responsible decision making about alcohol into these goals or values; and (3) provision of accurate normative information to students about peer drinking rates and problems as well as modifying students' attitudes about the acceptability to peers and parents of excessive alcohol consumption.

Information/knowledge programs. Seven studies (Darkes and Goldman, 1993; Flynn and Brown, 1991; Garvin et al., 1990; Kivlahan et al., 1990; Meier, 1988; Roush and DeBlassie, 1989; Schall et al., 1991) identified in the literature evaluated informational or knowledge-based approaches and met minimum inclusion criteria. The majority of these studies suffered from methodological limitations, such as high rates of attrition, noncomparability of the control group and nonspecific reporting of methodology and results, which made it difficult to draw meaningful conclusions. Despite these problems, and although several of the studies did demonstrate changes in knowledge or attitudes following these interventions, overall they provide little support for the efficacy of these approaches. Only one (Kivlahan et al., 1990) of the seven studies reported significant reductions in either drinking or negative consequences.

Kivlahan et al. (1990) evaluated an 8-week informational curriculum based on Alcohol Information School (AIS) for DWI offenders compared with an eight-session skills-training curriculum and an assessment-only control group. Results indicated participants in both the AIS and the Alcohol Skills Training Program (ASTP) intervention groups reduced their consumption over time. Participants who received the AIS program reduced their consumption from 19.4 drinks to 12.7 drinks per week at the 12-month follow-up compared with control group participants, who reported a slight *increase* from 15.6 to 16.8 drinks per week. However, neither the participants in the AIS group nor the control group fared as well as the ASTP group (who experienced a reduction from 14.8 to 6.6 drinks per week at the 12-month follow-up).

Values clarification programs. Five studies (Barnett et al., 1996; Meacci, 1990; Sammon et al., 1991; Schroeder and Prentice, 1998; Thompson, 1996) included a values clarification condition or included values clarification activities as part of a broader informational approach. Although, of the five studies, two—On Campus Talking About Alcohol (Sammon et al., 1991) and Delts Talking About Alcohol (Thompson, 1996)—reported reductions in drinking rates between baseline and follow-up assessments, insufficient information about the samples, procedures and the comparability of participants in the intervention and control conditions limits the strength of the conclusions drawn from these data. The remaining three studies were constrained by methodological limitations, such as problems with recruitment and retention of participants and noncomparability of control and experimental groups, and provided little support for the efficacy of the programs.

Normative reeducation programs. Two studies (Barnett et al., 1996; Schroeder and Prentice, 1998) incorporated a normative reeducation group in their evaluation. Barnett et al. (1996) utilized peers to provide normative reeducation, either alone or in combination with values clarification

TABLE 1. Summary of study designs and outcomes

Study	Participants	Pretest	Posttest	Follow-up	Intervention conditions	Outcome
Agostinelli et al., 1995	26 moderately heavy-drinking male students	X	6 wks		1. Mailed personal feedback 2. No feedback	Experimental group drank less than control.
Ametrano, 1992	136 freshman, nonrandomly assigned	X	X	2 mo.	1. Information + coping skills 2. No treatment	Not significant.
Aubrey, 1998	77 youth ages 14-20 presenting for outpatient treatment, randomly assigned	X		3 mo.	1. Brief motivational interview 2. Standard care	Significant increase in days abstinent and treatment sessions attended in intervention group.
Baer et al., 1992	132 heavy-drinking young adults	X	3 mo.	6/12/24 mo.	1. Alcohol skills training group (group) 2. Alcohol skills training (self-help) 3. 1-hour feedback only	Significant reductions in drinking in all 3 intervention groups.
Barnett et al., 1996	317 students, nonrandomly assigned	X	X	3 mo.	1. Peer norms 2. Values clarification 3. Peer norms + values clarification 4. No treatment	Norms changed most in Conditions 1 and 3. No significant intervention effects on drinking.
Borsari and Carey, 2000	60 heavy-drinking students, randomly assigned	X		6 wks	1. Brief motivational interview 2. Assessment only	Significant reductions in drinking in the brief motivational interview group as compared with assessment only group.
Cronin, 1996	128 students, randomly assigned		X		1. Diary anticipating alcohol use and problems during spring break 2. Postassessment only	Participants in diary condition reported lower consumption and fewer problems at posttest than did control group.
D'Amico and Fromme, 2000	300 high school students, randomly assigned	X	X		1. Risk skills training program 2. DARE brief group 3. Control	RSTP participants reported decreased alcohol and drug use, driving while intoxicated and riding with intoxicated drivers.
Darkes and Goldman, 1993	50 moderately heavy-drinking male students	X	2 wks		1. Expectancy challenge 2. Education 3. No treatment	Expectancy challenge Group 1 drank less than Group 2 and control.
Darkes and Goldman, 1998	50 moderate/heavy-drinking male students, randomly assigned	X	2 wks	6 wks	1. Social/sexual expectancy challenge intervention 2. Arousal/cognitive expectancy challenge 3. Assessment control group	Both expectancy challenge groups reported decreased consumption.
Dimeff, 1997	41 heavy-drinking students in a college health center, randomly assigned	X		30 days	1. Computerized feedback and physician advice 2. Assessment only	Participants adequately exposed to the intervention reported decreased use and consequences compared with those with less exposure.
Flynn and Brown, 1991	31 students involved in alcohol conduct violations matched with controls	X	X	3 mo.	1. Education + personal evaluation 2. No treatment	Not significant.
Garvin et al., 1990	60 fraternity members, nonrandomly assigned	X	2 wks	5 mo.	1. Self-monitoring + self-management training 2. Self-monitoring + information 3. Self-monitoring only 4. No treatment control	At 5-month follow-up, monitoring-only group drank less than other experimental groups and control. Self-management group also reported decreased consumption, compared with information and control groups.
Jack, 1989	46 nursing students in treatment course compared with 36 students in other courses (nonrandom)	X	X		1. Information and skills 2. Assessment control	No behavior change.
Jones et al., 1995	90 drinking students	X	X	24 days	1. Expectancy information + written essay 2. Expectancy information only 3. Nonalcohol-related information	No significant difference across time by intervention group, but trend favoring Group 1.
Kivlahan et al., 1990	36 moderately heavy-drinking students	X	1 wk	4/8/12 mo.	1. Skills training 2. Information 3. No treatment control	Experimental groups both drank less than control, with skills training most effective.

Continued

TABLE 1. *Continued*

Study	Participants	Pretest	Posttest	Follow-up	Intervention conditions	Outcome
Larimer et al., 2001	296 frat/sorority pledge members, quasirandom assignment	X		1 yr	1. Brief motivational interview 2. Assessment-only control	Male students in the intervention condition significantly reduced consumption.
Marcello et al., 1989	58 varsity athletes	X	X	2 mo.	1. Education + skills training + peer pressure skills 2. Wait-list control	Not significant.
Marlatt et al., 1998	348 heavy-drinking freshmen	X	6 mo.	12/24 mo.	1. Self-monitoring + personalized feedback (Year 1) + mailed feedback (Year 2) 2. No feedback control	Experimental group drank less heavily and had fewer negative consequences than control group.
Meacci, 1990	73 experimental and 63 control subjects, nonrandomly assigned	X	X	3 mo.	1. 15-week values clarification courses 2. Students in other nonaddiction courses	No effect.
Meier, 1988	71 students	X	X		1. Computerized alcohol information 2. Written alcohol information 3. Attention/placebo control	Changes in knowledge in Conditions 1 and 2. No behavior change.
Miller, 1999	547 freshman students, randomly assigned	X	3 mo.	6 mo.	1. 2-session peer-led skills program 2. 2-session peer-led alcohol 101 CD-ROM 3. Repeated assessment only 4. Single assessment only	Participants in Groups 1-3 showed reduced consumption as compared with Group 4.
Monti et al., 1999	94 adolescents in hospital ER for alcohol-related incident, randomly assigned	X	3 mo.	6 mo.	1. Brief motivational interview 2. Standard care	Those who received intervention reported fewer negative consequences, reduced drunk driving and fewer traffic violations.
Murphy et al., 1986	60 heavy-drinking male students	X	X	6 wks	1. Exercise (running) 2. Meditation 3. Assessment control	Participants in the running group reported the greatest reductions in drinking at posttreatment. High compliance meditators showed similar declines.
Rohsenow et al., 1985	36 heavy-drinking male students	X	X	2.5/5.5 mo.	1. Relaxation training 2. No treatment	Experimental group drank less than control at 2.5 mo., but not at 5.5 mo.
Roush and DeBlassie, 1989	24 college student ACOAs	X	X		1. 4-hour information video series on alcoholism 2. Eight, 90-minute informational group counseling sessions	Increase in knowledge in both conditions. Healthier coping attitudes in group counseling; no behavior change.
Sammon et al., 1991	140 dental students at two schools, nonrandomly assigned	X	X	2 mo.	1. OCTAA information/values clarification/risk reduction as part of voluntary addictions course 2. Other dental school curriculum with assessment only	Larger percentage of OCTAA participants had reduced consumption from ≥4 to 0-3 per occasion.
Schall et al., 1991	130 students, nonrandomly assigned	X	8 mo.	No	1. Peer-directed alcohol awareness 2. Did not attend	Not significant.
Schroeder and Prentice, 1998	Freshmen college students, quasirandom assignment	X	X	4-6 mo.	1. 1-hour peer-oriented normative intervention 2. 1-hour values clarification/ decision making.	Peer-based normative intervention produced reductions in consumption; no change in values clarification condition.
Thompson, 1996	53 DTAA program attendees and 116 control fraternity members, nonrandomly assigned	X	6 mo.	20 mo.	1. Delts Talking About Alcohol 2. Control fraternity assessment only	Greater % of participants in DTAA reported lower-risk consumption at follow-up, as compared with increased % of high-risk drinkers in control fraternity.
Walters et al., 2000	Heavy-drinking students randomized to condition	X		6 wks	1. Mailed feedback 2. Feedback and skills group 3. Assessment control	Mailed feedback superior to group and control.
Walters et al., 1999	Heavy-drinking students, randomized to condition	X		6 wks	1. Mailed feedback 2. Feedback and values clarification 3. No treatment control	Mailed feedback superior to values clarification and control.

information, to students in residence halls and fraternities/sororities. Although there were no differential effects of the interventions on drinking behavior over time, participants who received either of the normative reeducation interventions reported significantly greater changes in their perception of the norms than did participants in the values clarification-only and control groups. Regression analyses indicated changes in norms from baseline to postintervention predicted subsequent reductions in alcohol consumption regardless of prevention condition.

Schroeder and Prentice (1998), in contrast, reported that participants who received a 1-hour peer-delivered normative reeducation program (similar to that utilized in the Barnett et al. 1996 study) did report significant reductions in drinking compared with the alternative values clarification program, but there were no differences in increased accuracy of normative perceptions. Their data suggest that the change in drinking following the normative reeducation intervention was the result of weakened proscriptive strength of the norm (perceiving the norm as less universally adhered to, therefore less powerful), rather than a change in perceptions reflecting a more moderate norm. Participants in the Schroeder and Prentice (1998) study were freshmen residence hall members, as compared with a mixed-age population of residence hall and Greek system members in the Barnett et al. (1996) report, which may be one factor in the discrepancy between the findings of these two studies. It is possible that freshmen students may be more amenable to normative interventions, given that they have had less exposure to the influences of campus norms. Other explanations for the discrepancy in findings may involve differences in the measurement of both norms and drinking behavior between the two studies, as well as attrition in the study conducted by Barnett et al.

In summary, although several outcome studies evaluating traditional informational programs with college students have been conducted in the past 15 years, the majority of these studies have found no effect of the interventions on alcohol use and/or alcohol-related negative consequences. In his recent meta-analysis of the college alcohol prevention literature from 1983-1998, including only those trials with random assignment to condition, Maddock (1999) concluded that typical education/awareness-based programs (including values clarification approaches) produce on average only small effects on behavior (d = .17). These findings suggest that continuing to pursue approaches based solely on informative or awareness models is a poor use of resources on college campuses. Values clarification approaches such as On Campus Talking About Alcohol may be efficacious, but have not been evaluated in randomized trials and are time and resource intensive. Educational programs based on normative reeducation approaches are less costly and may hold more promise, but have yet to be widely tested.

Cognitive-behavioral skills-based programs

Cognitive-behavioral skills-training programs are a relatively newer addition to the college drinking prevention repertoire than are educational or awareness approaches. Many cognitive-behavioral programs also incorporate information, values clarification and/or normative reeducation components, but do so within the context of teaching skills to modify beliefs or behaviors associated with high-risk drinking. Cognitive-behavioral programs range from specific alcohol-focused skills training (including expectancy challenge procedures, blood-alcohol discrimination training or self-monitoring/self-assessment of alcohol use or problems) to general life skills training with little or no direct relationship to alcohol (such as stress management training, time management training or general assertiveness skills). The majority of programs are multimodal, including both specific alcohol-focused skills as well as general life skills.

Specific alcohol-focused skills training. Three studies of expectancy challenge procedures that met inclusion criteria, two of which (Darkes and Goldman, 1993, 1998) showed statistically significant positive effects at short-term follow-up. The third (Jones et al., 1995) demonstrated trends in drinking supportive of the expectancy challenge interventions, but did not achieve statistical significance.

Darkes and Goldman (1993) randomly assigned heavy-drinking male participants to receive either alcohol or a placebo. Participants consumed beverages in a social setting that included activities with a social or sexual component and then attempted to guess which participants (including themselves) had consumed alcohol or placebo based on their behavior. In addition, participants received information about placebo effects of alcohol and monitored expectancy-relevant events in their environment throughout the course of the 4-week study. Expectancy challenge procedures were conducted during three 45-minute sessions. In contrast to participants who received traditional alcohol education and to an assessment-only control group, participants in the expectancy challenge group reported a significant decrease in their alcohol use at 2-week follow-up.

Similarly, Darkes and Goldman (1998) randomly assigned 54 heavy-drinking male participants to an assessment-only control condition or one of two expectancy challenge conditions, targeting either sociability or arousal, using the procedures describes above to challenge social expectancies, whereas arousal expectancies were challenged during tasks involving either sedating cues or problem-solving tasks. The study also included a 15-minute passive "booster" session 4 weeks after completion of the expectancy challenge procedures, with an additional follow-up 2 weeks later (6 weeks after the challenge procedure). Results indicated participants in both expectancy challenge conditions significantly reduced their alcohol consumption by 2 weeks posttreatment

as compared with participants in the control group, who demonstrated an increase in consumption. Participants in all three conditions indicated a subsequent decrease in drinking by the 6-week follow-up, with the expectancy conditions demonstrating the largest reductions. Importantly, in both of the Darkes and Goldman (1993, 1998) studies, heavy drinkers showed the largest impact of the expectancy challenge procedures, in contrast to other interventions demonstrating better effects for moderate or light-drinking students.

In contrast to the Darkes and Goldman studies, Jones et al. (1995) evaluated an expectancy challenge procedure incorporating didactic information and discussion about alcohol expectancies, including self-monitoring of expectancies, with or without an expectancy self-challenge procedure (randomly assigned), but without the experiential component of alcohol administration. Twenty-four-day follow-up indicated drinking overall was reduced over time, but changes in drinking over time were not found to vary significantly by condition. However, post hoc analyses indicated only those participants in the expectancy with self-challenge condition significantly decreased their drinking from pretesting to follow-up.

Findings from these three studies suggest that expectancy challenge procedures may have considerable utility for decreasing alcohol use among college males. These findings also suggest that increasing the personalization and experiential component of expectancy information and providing practice in challenging expectancies may be necessary for these programs to be effective. Studies that replicate these findings on a larger scale, with women as well as men, and with a longer-term follow-up are needed to evaluate this prevention approach more fully. In addition, further evaluation of the relative impact of expectancy challenge procedures with and without an alcohol administration component is needed.

Three studies (Cronin, 1996; Garvin et al., 1990; Miller, 1999) evaluating self-monitoring or self-assessment of alcohol use as an intervention were reviewed, all of which indicated significant positive effects of this strategy on either consumption, negative consequences or both.

Cronin (1996) compared student drinking rates and problems assessed at the end of spring break between students who were randomly assigned to complete a diary anticipating alcohol consumption and problems for the upcoming spring break week and those who were assigned to a no-treatment control group. Results indicated those students who completed the diary prior to spring break reported fewer negative consequences at the end of spring break than did those students in the control group.

In their study of fraternity pledge class members, Garvin et al. (1990) trained participants in a self-monitoring-only group to record their daily alcohol consumption during a 7-week period. Participants in this condition received no other intervention. It is interesting to note that, at the 5-month follow-up, participants in the self-monitoring group reported statistically lower alcohol consumption than did participants in both the no-treatment control group and the alcohol education group.

Miller (1999) compared students who participated in three computerized assessments of their drinking (with no additional intervention during their freshman year) with participants who also received a two-session peer-delivered alcohol skills-training program or a two-session peer-facilitated interactive CD-ROM skills group (the Alcohol 101 CD-ROM, Reis et al., 2000). Participants were 547 students at varying levels of risk for alcohol-related problems, randomly assigned to one of these three conditions or a single-assessment-only control group, who completed the alcohol assessment only at the end of their freshman year. Although some outcome measures favored the two intervention groups as compared with the repeated assessment condition, on average students in the repeated assessment group reported decreases in drinking and consequences at the 6-month follow-up similar to those in the two experimental conditions. Importantly, participants in the single-assessment-only group were drinking more and experiencing more problems than those in any of the other three groups by the end of the freshman year, despite having been randomly assigned to condition at the beginning of the year. These results suggest that the opportunity to respond to questions about drinking and negative consequences in the absence of any additional feedback served as an intervention for those participants in the repeated assessment group. One limitation of this study is that there was a low initial response rate to recruitment efforts (approximately 25%), and all conditions included a fairly high percentage of abstainers and light drinkers (41% and 32%, respectively).

Despite limitations, each of these three studies not only provides support for the role of assessment in promoting change, but also has implications for the conclusions drawn from other longitudinal studies including repeated assessment control groups. Inclusion of single-assessment control groups in randomized longitudinal designs may be necessary to assess program outcome more accurately.

Multicomponent alcohol skills training. The majority of studies evaluating cognitive-behavioral prevention approaches include a multicomponent skills-training condition. Seven studies (Ametrano, 1992; Baer et al., 1992; Garvin et al., 1990; Jack, 1989; Kivlahan et al., 1990; Marcello et al., 1989; Miller, 1999) evaluating a total of 10 multicomponent skills-based interventions were identified in the literature. Of these, three interventions (Ametrano, 1992; Jack, 1989; Marcello et al., 1989) indicated no positive effect on alcohol use or consequences, whereas seven interventions (Baer et al., 1992; Garvin et al., 1990; Kivlahan et al., 1990; Miller, 1999) were found to have at least some effects on alcohol consumption, problems or both.

Baer et al. (1992) compared three formats of a similar ASTP to evaluate whether intensity or format of the inter-

vention would affect the magnitude of change. Participants were heavy-drinking volunteers randomly assigned to receive either a six-session version of the ASTP, a single individual session incorporating risk feedback and advice to change or a self-help manual incorporating the ASTP content. Results indicated participants in all three conditions who completed the intervention showed significant change from baseline to follow-up in drinking rates and problems. However, there was substantial attrition in the self-help condition, such that this condition was eliminated from recruitment midway through the study.

Garvin et al. (1990) included a skills-training group as one condition in their study of fraternity pledge classes. The program consisted of four 45-minute sessions designed to teach moderate drinking skills, blood alcohol concentration discrimination and assertiveness skills (including drink refusal). Participants in this condition also self-monitored their alcohol consumption for 7 weeks. Results indicated significant reductions in average weekly alcohol consumption for participants who received the skills-training intervention, which appear comparable in magnitude with those reported in the monitoring-only condition.

Kivlahan et al. (1990) evaluated an 8-week multicomponent ASTP, including assertive drink refusal skills, relaxation and general lifestyle balance skills and alcohol-specific skills such as drink pacing, limit setting and blood-alcohol discrimination training. Results indicated that the participants who received the skills-training intervention showed significant reductions in alcohol use and consequences throughout a 2-year follow-up as compared with students who received the alcohol information school program or assessment only.

Miller (1999) compared a two-session, peer-delivered ASTP with two-session computerized information/skills-training via Alcohol 101 CD-ROM (Reis et al., 2000) and with a repeated assessment-only control group and a single-assessment control group. Both skills-based interventions included information on accurate norms for alcohol consumption, blood alcohol concentration effects and blood alcohol estimation as well as myths and placebo effects of alcohol. Differences favoring the two skills-based interventions were noted within drinking subgroups of participants, including increases in knowledge and motivation to change. In addition, light-moderate drinking students who received either of the skills-based interventions reported significantly reduced negative consequences of drinking as compared with those in the repeated assessment-only condition; abstainers and heavy drinkers in the sample did not appear to differentially benefit from the interventions as compared with repeated assessment only. Participant satisfaction was significantly higher in the ASTP groups than in the CD-ROM group, suggesting students on average preferred the more interactive ASTP approach.

General life skills training/lifestyle balance. Two studies (Murphy et al., 1986; Rohsenow et al., 1985) in the college student population evaluated the outcome on drinking behavior of general lifestyle skills/lifestyle balance. Both indicated at least short-term benefits on drinking rates.

Murphy et al. (1986) randomly assigned 60 heavy-drinking male students to 8 weeks of exercise, meditation or assessment only. Results indicated participants in the exercise condition significantly reduced their mean weekly ethanol consumption as compared with participants in the control group (60% reduction from baseline to week 10), despite the fact that alcohol use reduction was not a specified goal of the intervention. Reductions in use were largely maintained in the exercise group (6 weeks) even after cessation of the active intervention. Participants in the meditation condition were less likely to have been compliant with meditating; however, those who did meditate showed reductions in drinking similar to those in the exercise group.

Rohsenow et al. (1985) randomly assigned 36 heavy-drinking students to a general stress-management course or an assessment-only control condition. Results indicated participants who received the intervention reported decreased alcohol consumption at 2.5-month follow-up as compared with participants in the control group. However, by 5-month follow-up, these results were no longer significant.

In summary, several cognitive-behavioral interventions including specific, global or multicomponent skills-training approaches have been associated with behavioral changes in drinking. The magnitude of these effects varies depending on the interventions and the populations studied, but generally support the efficacy of these approaches for universal, indicated and selective prevention. Research designs evaluating these approaches have generally been stronger than those utilized with educational programs, but methodological limitations are still evident in this research primarily due to small sample sizes and relatively high attrition rates in some samples.

Motivational/feedback-based approaches

Brief motivational interventions. Eight studies (Aubrey, 1998; Baer et al., 1992; Borsari and Carey, 2000; D'Amico and Fromme, 2000; Dimeff, 1997; Larimer et al., 2001; Marlatt et al., 1998; Monti et al., 1999) were reviewed that met inclusion criteria and evaluated the efficacy of brief (one or two session) individual or group motivational enhancement approaches, typically incorporating alcohol information, skills-training information and personalized feedback designed to increase motivation to change drinking. Of these, four were conducted with college student samples (Baer et al., 1992; Borsari and Carey, 2000; Larimer et al., 2001; Marlatt et al., 1998), three were conducted with college-age samples in medical/mental health settings (Aubrey, 1998; Dimeff, 1997; Monti et al., 1999) and one

was conducted with high school students but was directly relevant to the topic of this article due to similar age groups and similar prevention materials (D'Amico and Fromme, 2000). Each of these interventions demonstrated significant effects on drinking behavior, consequences or both.

As mentioned, Baer et al. (1992) compared three formats of the ASTP and found a single session of brief advice was comparable to a 6-session ASTP group and a 6-session correspondence course in reducing alcohol use. Marlatt et al. (1998) extended these findings through randomly assigning 348 high-risk freshman students to receive or not receive a brief (45-minute) in-person motivational feedback session. Feedback included personal drinking behavior and negative consequences, accurate normative information and comparison of personal drinking to the actual campus norms and advice/information regarding drinking reduction techniques (Dimeff et al., 1999). This approach is thus a hybrid of skills training, information, normative reeducation and brief motivational enhancement. Results indicated participants in the intervention group reduced their consumption and negative consequences significantly and maintained those reductions through a 2-year follow-up.

Borsari and Carey (2000) replicated the Baer et al. (1992) and Marlatt et al. (1998) studies at a large northeastern university utilizing a student population screened from an introductory psychology course. Sixty participants who reported having consumed five or more drinks (four or more drinks for women) two or more times in the previous month were recruited. Students were randomized into a brief motivational interview condition (n = 29) that was modeled after the intervention described in Dimeff et al. (1999) or into an assessment-only control group (n = 31). At 6-week follow-up, participants in the brief motivational interview condition demonstrated significant reductions in both quantity and frequency of alcohol consumption as well as a decline in the number of reported heavy episodic drinking events as compared with control participants. However, neither intervention nor control participants showed reductions in alcohol-related consequences, as measured by the Rutgers Alcohol Problem Index (White and Labouvie, 1989). Interestingly, changes in perceived norms mediated the relationship between intervention and drinking reductions, suggesting that the normative feedback component of the Dimeff et al. intervention is a critical component.

Larimer and colleagues (Anderson et al., 1998; Larimer et al., 2001) also replicated the Marlatt et al. (1998) study, implemented with first-year members of intact fraternities and sororities. Participants were 296 members of 12 fraternities and 6 sororities randomly assigned by house to either the brief individualized feedback program or an assessment-only control condition. At 1-year follow-up, fraternity members who received the intervention reported a decrease in consumption from 15.5 to 12 standard drinks per week compared with an increase in the control group from 14.5 to 17 drinks per week. Participants in the intervention group also reported a decrease in estimated peak blood alcohol concentration from .12% to .08% as compared with participants in the control group, who reported no change in peak blood alcohol concentration over time. Sorority women did not differ in alcohol use over time as a function of condition, although this result may be attributable to a smaller than expected original sample.

Aubrey (1998) utilized brief motivational interventions with 77 adolescents (ages 14-20, with a mean age of 17) presenting for outpatient substance abuse treatment. Following intake assessment, youth participants were randomly assigned to standard care (n = 39) or to receive two brief motivational feedback interviews utilizing the assessment results (n = 38). Results at 3-month follow-up indicated participants who received the intervention reported a greater percentage of days abstinent (70% vs 43%), as well as increased treatment attendance (17 vs 6 sessions attended) and decreased negative consequences of alcohol.

Dimeff (1997) conducted a computerized assessment of alcohol use and problems in a college health center waiting room and randomly assigned high-risk participants to receive the assessment only (n = 24) or a computerized, personalized graphic feedback regarding alcohol risks and suggestions for reduced risk, which was reviewed with their primary care provider (n = 17). Although limited by small sample size, moderate-to-large treatment effects for both drinking (d = .81) and consequences (d = .54) were observed in the intervention group. These findings suggest that use of computer-generated feedback in a health care setting may be a viable option for prevention of alcohol misuse.

Monti et al. (1999) utilized a brief motivational intervention to reduce alcohol use and consequences among 94 adolescents ages 18-19 who were seen in the emergency room following an alcohol-related event. Participants were randomized to receive the intervention or the usual emergency room care. Results at 3-month follow-up indicated participants who received the intervention had significantly lower incidence of drinking and driving, traffic violations, injuries and alcohol-related problems than did patients who received the usual care intervention. However, participants in both conditions reported reductions in consumption.

D'Amico and Fromme (2000) randomly assigned 300 high school students to participate in a Risk Skills Training Group (n = 73), including both skills training and personalized motivational feedback; a brief version of the DARE program (n = 77); or a no-treatment control group (n = 150). Results indicated that, at posttreatment assessment, participants in the Risk Skills Training Group significantly reduced the frequency with which they drank heavily, drove after drinking, rode with an intoxicated driver and used drugs.

Taken together, these studies provide strong support for the efficacy of brief, personalized motivational enhancement techniques, delivered individually or in combination

with risk skills-training information delivered in small groups. In addition, studies of brief motivational enhancement approaches have generally been methodologically superior to earlier studies, including randomization to condition, standardized assessment of outcome, manualized and/or well-described interventions and relatively large sample sizes. Longer-term follow-up of these interventions is warranted.

Mailed feedback. Interestingly, three recent studies (Agostinelli et al., 1995; Walters et al., 1999, 2000) suggest the efficacy of brief motivational enhancement approaches may not depend on the individual or interpersonal component, but might instead be a result of the feedback employed in these approaches.

Agostinelli et al. (1995) randomly assigned 24 heavy-drinking students identified through a mass-testing procedure to either receive mailed graphic feedback or no treatment. Results indicated that, at 6-week follow-up, participants who received the mailed feedback reported reductions in consumption of nearly eight drinks per week as compared with control participants, who remained unchanged.

Similarly, Walters (2000) described two trials (Walters et al., 1999, 2000) of mailed graphic feedback as compared with a group skills plus feedback condition and a no-treatment control group. In each case, mailed graphic feedback was significantly more effective alone than in combination with skills-training information. Participants in the first study (n = 37) were moderate- to heavy-drinking students randomized to condition. At 6-week follow-up, feedback participants indicated a reduction of nearly 14 drinks per week as compared with 6 drinks per week among group participants and less than 1 drink in the control group. In the second study (Walters et al., 1999), 34 participants were assigned to feedback only, assessment only or a modified group consisting of values clarification activities with a review of the feedback along with mailed feedback. Results again favored the feedback-only condition (6.6 drinks per week reduction compared with .35 drinks per week in group intervention and 2.75 drinks per week in the control group).

Each of these studies is limited by relatively short-term follow-up and by the potential for selection bias due to the relatively small sample sizes and lack of information about the samples. Despite these limitations, findings regarding the efficacy of direct-mail feedback are encouraging, and larger-scale studies of this approach are warranted. In particular, additional trials of the efficacy of motivational enhancement approaches and personalized graphic feedback alone and in combination may aid in identifying the effective components of these interventions.

Intensive treatment and medication

No treatment studies were identified that met minimum study inclusion criteria, primarily due to a lack of control or comparison conditions in these studies. Two studies (Bennett et al., 1996; Keller et al., 1994) reported pre- and postoutcome results that compare very favorably with other treatment outcome studies, suggesting incorporation of a residential or intensive outpatient component into on-campus treatment services may be an effective means of maintaining academic connections for students with more serious alcohol-related problems.

One study (Davidson et al., 1996) evaluated the impact of naltrexone as opposed to placebo on latency to drink alcohol and overall amount of alcohol consumed by social-drinking college students in a laboratory setting. Results indicated naltrexone was effective in increasing latency to drink and in reducing overall consumption. This finding suggests that opioid blockers may be a useful adjunct to treatment for college students wishing to moderate consumption.

Intervening with High-Risk Subpopulations

Within the college student population some groups of students have traditionally been viewed as being at increased risk for alcohol-related problems. These include Adult Children of Alcoholics, members of Greek letter organizations (fraternities/sororities), student athletes, freshmen (Canterbury et al., 1992; Dielman, 1990; Klein, 1989; Meilman et al., 1990; Pope et al., 1990) and students referred for conduct violations involving alcohol (mandated students).

Here we summarize the results of preventive interventions that have been evaluated with these special populations. Because each of the efficacious interventions is described in more detail in the preceding sections, only general conclusions and citations for relevant studies are provided here.

Adult Children of Alcoholics

Although descriptive studies abound (Bosworth and Burke, 1994; Havey and Dodd, 1993; Rodney, 1996; Sher and Descutner, 1986; Sher et al., 1991, 2001), only one study identified between 1984 and 1999 specifically evaluated a prevention program for Adult Children of Alcoholics in the college population (Roush and DeBlassie, 1989). This study compared two informational/educational approaches and found no effect of either intervention on behavior. However, Adult Children of Alcoholics appear comparable with those without a parental family history of alcoholism regarding response to interventions utilized with the general college student population. Specifically, Marlatt et al. (1998) found students with a parental family history of alcoholism showed similar response to a brief motivational interview as did their peers without such a family history. In addition, Sammon et al. (1991) and Jack (1989) both indicated a trend toward students with parental family

history responding more positively to their informational/values clarification/risk-reduction interventions than did those students without a parental family history of alcoholism. Although both the Sammon et al. and Jack studies are limited due to nonrandom assignment to condition and small sample size, these results warrant further investigation.

Programs for fraternity/sorority members

Several studies evaluated prevention programs for fraternity/sorority members or included Greek members in the evaluation of programs for general college student populations. Five of these approaches indicated positive effects on behavior of fraternity and/or sorority members. Of these, two incorporated brief motivational feedback (Larimer et al., 2001; Marlatt et al., 1998), two were skills-based (the alcohol monitoring and behavioral skills-training conditions evaluated by Garvin et al. [1990]), and one involved information in conjunction with values clarification and risk-reduction guidelines (Delts Talking About Alcohol; Thompson, 1996). Only Marlatt et al. (1998) utilized a true experimental design with randomization at the level of the individual, and this study is also the only study that included (sufficient) sorority women to assess effects of the intervention on women's drinking. Of note, even after reducing their drinking through participation in these efficacious prevention programs, fraternity members, on the average, continued to drink heavily and remained at substantial (although reduced relative to baseline) risk for negative consequences. Other prevention programs sponsored by the National Inter-fraternity Conference or Panhellenic, including such promising interventions as Our Chapter, Our Choice, have yet to be rigorously evaluated.

Programs for athletes

Several articles describing drinking behavior of athletes or evaluating the effectiveness of training programs for athletic department personnel in the implementation of policies and prevention programs targeting alcohol consumption by college athletes are available in the literature (Grossman and Smiley, 1999). In contrast, only one published prevention outcome study with college student athletes meeting minimum inclusion criteria was identified in this review (Marcello et al., 1989). This study failed to find an effect of a multicomponent skills-training intervention with student athletes. Clearly, additional outcome research with this population is needed.

Freshmen

Several outcome studies identified in this review focused exclusively or primarily on freshmen students (Larimer et al., 2001; Marlatt et al., 1998; Miller, 1999; Schroeder and Prentice, 1998). In general, brief motivational enhancement approaches, skills-training approaches (including self-assessment of alcohol use) and peer-based normative re-education approaches have all been shown to be successful at reducing alcohol use and/or negative consequences among freshmen. Although freshmen represent a segment of the college population at increased risk for heavy drinking and alcohol-related negative consequences (Pope et al., 1990), these studies suggest that they are nonetheless quite responsive to alcohol prevention programs that are non-judgmental, include a normative reeducation component and emphasize skills and personal responsibility for change.

Mandated students

Finally, only one study identified in this review specifically evaluated a prevention program for judicially mandated college students. Flynn and Brown (1991) failed to find an effect of the Alcohol Information School curriculum with this population. This lack of research on mandated students is particularly problematic given that some students may violate campus conduct policies in isolated instances (being in the wrong place at the wrong time), whereas other students may be exhibiting a more chronic pattern of heavy drinking coupled with policy violations. Clearly, evaluating the effectiveness of prevention programs provided to mandated students is both an urgent research priority and an ethical necessity.

Identification, Referral and Recruitment Strategies

In contrast to the state of the field when Moskowitz (1989) published his discouraging review, there is now a growing body of evidence that several types of prevention approaches "work"; that is, students who (voluntarily) participate in these interventions show reductions in alcohol use and/or consequences. This literature also indicates some types of interventions are associated with larger reductions in use or consequences than are others (Maddock, 1999).

Despite the advances made in developing and testing efficacious prevention approaches, another difficulty is often present in the college setting, which limits the utility of individually focused prevention efforts. Specifically, many students do not participate in these programs, and those students who most need them appear to be least likely to utilize them (Black and Coster, 1996). For example, Black and Coster (1996) found 46.2% of male drinkers and 39.6% of female drinkers had no interest in participating in even a minimal intervention involving informational brochures and flyers. In this section, we review some suggestions (with support from the literature) for increasing identification, recruitment and retention of students into individually focused prevention/treatment programs.

Marketing and outreach efforts

One consideration in solving the problem of low attendance at alcohol prevention services is to remember that students are *consumers* of these services. Attending to the lessons learned in the advertising and marketing fields is therefore an important step in designing and providing alcohol prevention services. In particular, social marketing techniques have been utilized recently to promote increased accuracy of normative perceptions and decreased alcohol consumption on college campuses (Berkowitz, 1997; Haines, 1996; Haines and Spear, 1996). Research suggests social marketing techniques might also increase recruitment into campus alcohol prevention services (Black and Coster, 1996; Black and Smith, 1994; Gries et al., 1995).

Gries et al. (1995) conducted focus groups and interviews with residence hall students to develop and revise marketing and recruitment materials for a 1-hour alcohol education program. Results indicated significantly more students attended the program in the intervention hall ($n = 17$) than in the control hall ($n = 0$) or the combined average of the three historical halls ($n = 5$). Although even the rates of attendance in the intervention hall are low (i.e., more than 700 residents were eligible to attend), more than half of those students who attended were moderate to heavy drinkers. Black and Smith (1994) conducted survey research using Social Marketing Theory to evaluate factors that might increase recruitment into alcohol prevention or education programs. In both studies, students reported that convenience of the program (location, timing and time commitment required), an emphasis on what students could gain by participating (e.g., helping a friend, learning new information about alcohol) and by reducing consumption and the use of incentives for participation (e.g., a refund of student fees, university credit for attendance, food, prizes) were ranked as important factors for attendance. In addition, Black and Smith found students were more likely to attend if their friends could participate at the same time and that participants judged physicians and parents to be the most influential sources for communicating risk-reduction messages.

Incorporating treatment outreach services or program reminder contacts may also be effective in increasing recruitment of heavier drinkers or those in need of treatment (Black and Smith, 1994; Gottheil et al., 1997). Black and Smith (1994) found heavy drinkers, compared with the general population, rated reminder contacts as a more important strategy for increasing attendance at programs. Similarly, Gottheil et al. (1997) found that calling adult individuals who missed their first scheduled outpatient substance abuse treatment appointment resulted in increased treatment entry. In addition, participants recruited through these outreach efforts subsequently participated in and benefited from the treatment program as much as did those participants who had not missed their first appointment.

Use of standardized screening instruments

Routine screening of college students for alcohol misuse or problems may be another mechanism for increasing identification and referral of students to services. Identifying students at risk for alcohol-related problems early in their college career, and offering brief intervention to reduce these risks, has been shown to be an effective indicated prevention strategy (Marlatt et al., 1998). Incorporating brief alcohol screening measures into other standard contacts with undergraduates may minimize reactivity to these questions and increase participation rates compared with advertising voluntary "alcohol screening," which students may view as pejorative. Despite these potential advantages to routine screening, there are both practical and ethical considerations in implementing this strategy that would need to be addressed. These include choosing appropriate screening instruments, cost and use of the information once collected. Although choice of instruments is reviewed here, it is important for campuses considering routine screening to consider who will collect the information, what safeguards there are to protect confidentiality of students, what procedures are in place for referring students for services once a need is identified and who (besides the referral source) will have access to the information once it is collected

Regarding choice of screening instruments, there are a variety of screening and assessment tools available for evaluating and diagnosing alcohol-related problems. Unfortunately, many of these, such as the CAGE (Heck, 1991; Heck and Williams, 1995; Nyström et al., 1993; O'Hare and Tran, 1997; Smith et al., 1987; Werner and Greene, 1992; Werner et al., 1996) and the Michigan Alcoholism Screening Test (Martin et al., 1990; Nyström et al., 1993; Otto and Hall, 1988; Silber et al., 1985; Smith et al., 1987; Svikis et al., 1991), were developed using adult conceptualizations of alcohol-related problems, with a particular emphasis on the disease model of alcoholism and identification of chronic alcohol dependence. These instruments are limited by the fact that they may not be adequately sensitive to accurately identify individuals suffering from short-term problems. They also may not be adequately specific to separate those with short-term problems resulting from heavy episodic drinking from those with more serious alcohol-related problems. Some health centers or other referral sources on campus may choose to utilize these common adult screening measures despite limitations, as their brevity and familiarity make them easy to use. In this case, it is important for those using the measures to complete more detailed assessment following screening to better evaluate and meet the needs of the individual student. In addition, diagnosis of alcohol dependence on the basis of these assessments is *not* warranted.

An additional complication of screening and assessment with college students is the fact that alcohol diagnoses, in-

cluding the diagnosis of alcohol dependence, tend to be relatively unstable during the adolescent and young adult years (Grant, 1997). Only about 30% of students with an alcohol misuse or dependence diagnosis in college will continue to meet criteria into the later adult years (Fillmore and Midanik, 1984; Grant, 1997; Kilbey et al., 1998; Temple and Fillmore, 1985). Therefore, utilizing screening or diagnostic assessments in college to predict later adult adjustment or problems is a difficult endeavor, and one best avoided.

In contrast to adult measures, there are several assessments of alcohol use and alcohol-related negative consequences that have been developed specifically for college student populations. These include the Rutgers Alcohol Problem Index (White and Labouvie, 1989), the Young Adult Alcohol Problem Severity Test (Hurlbut and Sher, 1992) and the College Alcohol Problem Scale (O'Hare, 1997). Each of these is weighted toward identifying consequences common to the adolescent or young adult experience, thus increasing sensitivity to detect problems. The measures vary regarding specificity, but each provides considerable information regarding different types of negative consequences, which is valuable for prevention or treatment planning purposes. Assessment of quantity, frequency and pattern of use is also important for adequate prevention or treatment planning.

Health center and emergency room screening

One potential method for increasing participation in prevention and treatment services on campus while minimizing cost and increasing protections for individual students may be to incorporate screening for and, in some cases, the intervention itself into standard practice at campus health centers and emergency rooms. Two outcome studies identified in this review (Dimeff, 1997; Monti et al., 1999) incorporated brief motivational enhancement procedures, including assessment, into these health care settings. In both cases, motivational interviews delivered in a health care setting resulted in decreases in consumption and problems for college-age participants. In the Dimeff (1997) study, both assessment and feedback were generated using an interactive computer program available in the clinic waiting room, suggesting students with little to do while they wait might access and complete the intervention on their own with little staff involvement. Similarly, several computerized versions of alcohol screening measures have been developed for the college student population (Anderson, 1987; Miller, 1999; Rathbun, 1993). Incorporating routine screening of alcohol consumption and problems into standard health care practices in college clinics and either training medical/nursing/support staff to deliver motivational feedback or providing for computer-generated feedback without staff intervention may serve to increase participation in these programs.

Brief interventions to increase service entry and retention

In addition to utilizing brief motivational interventions for risk reduction, these approaches might be effective in increasing motivation for and retention in longer-term prevention or intervention programs. Aubrey (1998) found motivational feedback improved outcome for adolescents presenting for outpatient treatment. It is possible that mailed motivational feedback, such as that evaluated by Agostinelli et al. (1995), may have similar effects on recruitment and retention in more intensive services, but this has yet to be evaluated. Evaluating low-cost mailed or large-group brief interventions as universal prevention approaches designed both to reduce risky behavior and to increase participation in additional services may be a viable strategy.

Peer training for identification, referral and provision of services

The use of peers to deliver prevention services, as well as to assist with identification and referral of students in need of services, has a long history in the college student setting (Caron, 1993; D'Andrea and Salovey, 1998; Ender and Winston, 1984; Grossberg et al., 1993; Hatcher, 1995; Sloane and Zimmer, 1993). However, few studies have systematically evaluated the effectiveness of peers as either providers of service or as referral sources.

In the current review, nine of the individually oriented prevention approaches reviewed in the first section were delivered by peer providers (Barnett et al., 1996; Larimer et al., 2001; Miller, 1999; Schall et al., 1991; Schroeder and Prentice, 1998). Of these, only four demonstrated efficacy in reducing consumption or reducing consequences, including a normative reeducation approach (Schroeder and Prentice, 1998), a motivational feedback approach (Larimer et al., 2001) and two skills-based approaches (Miller, 1999). Although these results have led some to conclude that peers are not effective in delivering prevention services, in fact peers have *not* typically been systematically compared with professional providers. Therefore, lack of efficacy of the approaches evaluated cannot be clearly determined to be the result of the program, the peer providers or some combination of both. In one study that included random assignment of peer or professional providers (Larimer et al., 2001), preliminary data suggest peers are at least as effective at promoting change in drinking behavior among fraternity pledges using a brief motivational intervention as professional-level staff. However, more research is needed to evaluate carefully the efficacy and cost effectiveness of peer-delivered as compared with professionally delivered services.

Several programs also exist to train peers in identifying and intervening with their peers to promote less risky behavior as well as to increase utilization of available alcohol

prevention services. One area where data support this as a useful intervention strategy involves studies of naturalistic interventions in potential drunk driving incidents. Several survey research projects have indicated that, when there is intervention to stop an intoxicated individual from driving, peers are most often the ones to intervene, and the majority of these interventions are successful (Hernandez and Rabow, 1987; Newcomb et al., 1997).

Police/judicial referrals

The use of campus police and campus judicial officers to increase referrals to and completion of substance abuse prevention or treatment services is becoming a common practice (Stone and Lucas, 1994). There is growing evidence that students who violate campus alcohol or conduct policies are on average at increased risk for heavy drinking and related negative consequences (Flynn and Brown, 1991; O'Hare, 1997). These findings suggest that campus police and judicial officers may be valuable referral sources and should be knowledgeable about campus services to facilitate referral. Referral of policy violators to alcohol education, prevention or treatment services instead of or in addition to other legal sanctions is viewed as one means of reducing recidivism and promoting individual behavior change. Unfortunately, as described above, there are sparse data available regarding the effectiveness of this strategy on the college campus, either in terms of entry/retention of mandated students into services or the outcome of such services when provided. Research in the area of drunk driving in the general population suggests "diversion" programs are less effective when they are used in place of other sanctions (Hingson, 1996; Wells-Parker et al., 1995), but can be effective in combination with other swift and certain consequences of drunk driving (like license revocation or vehicle impoundment). In addition, the strength of the mandate (i.e., the consequences for failure to complete the program) is an important determinant of actual entry and retention in mandated services. Considerably more research is needed to evaluate whether, for whom and under what circumstances referral to prevention or treatment programs as a sanction strategy is effective on college campuses.

Conclusion and Summary of Research Priorities

This review of the literature covered individually focused prevention and treatment strategies evaluated between 1984 and 1999. Conclusions regarding efficacy of existing prevention and treatment programs are similar to those of previous reviews, in that little evidence exists for the utility of educational or awareness programs, including informational-based and values clarification approaches. One exception to this may be the Prime for Life program (formerly called On Campus Talking About Alcohol) (Sammon et al., 1991; Thompson, 1996), which has some evidence of efficacy. The Prime for Life program includes risk-reduction guidelines based on personal risk factors in addition to general information, which may contribute to increased efficacy. However, evaluations of this program available to date have been limited due to nonrandom assignment of participants and/or lack of a comparison group. Peer-based normative reeducation programs also show some support, but have similarly not been adequately tested. Therefore, randomized trials of these interventions with sufficient methodological rigor and adequate sample size to detect differences would be of value. To evaluate relative efficacy and cost effectiveness, these approaches should be evaluated in comparison to existing efficacious brief interventions.

Skills-based interventions have consistently yielded greater support for their efficacy than have informational interventions. Recently, several minimal skills-based interventions have been shown to result in decreases in alcohol consumption, including both self-monitoring/self-assessment of alcohol consumption as well as expectancy-challenge procedures involving alcohol/placebo administration. In addition, brief motivational feedback interviews have been demonstrated to be efficacious in a variety of contexts, including emergency rooms, outpatient counseling centers, fraternity organizations, high school classrooms and with randomly selected high-risk college freshman. Finally, mailed graphic feedback has been shown in three studies to result in decreases in alcohol consumption equivalent to or superior to skills-based groups combined with feedback. Several research priorities emerge from reviews of these studies. First, additional research is needed evaluating the role of self-assessment in drinking reductions and methods for facilitating this effect. Second, further research evaluating the conditions under which expectancy challenge procedures are effective is needed, particularly studies designed to disentangle the informational and experiential components of expectancy challenge procedures. Inclusion of longer-term follow-up is also needed. Similarly, additional studies that disentangle the effects of graphic feedback alone from skills training alone and in combination with feedback are needed. In general, replication of each of these techniques in larger-scale studies by investigators not involved in the development of the techniques is warranted. In particular, larger samples allowing for evaluation of gender, ethnicity, residence-type, athlete status and family history effects on response to these interventions would yield valuable information.

Studies evaluating on-campus treatment programs are also lacking in the literature, as are studies evaluating the effects of any of these interventions with students mandated to comply. Given the ethical concerns inherent in mandated treatment, evaluation of services for mandated students is an urgent priority.

In addition to effectiveness or efficacy trials of interventions already available on campus, this review suggests the field could benefit from additional research regarding service delivery systems, including the most effective means for screening, identifying, recruiting, referring and retaining students in alcohol prevention services. Systematic evaluation of marketing and recruitment techniques, as well as training for police, faculty, staff and medical/mental health personnel, is needed.

The evidence from this review suggests campus personnel searching for effective individually oriented practices to implement on their campus right now would be best served by implementing brief, motivational or skills-based interventions, targeting high-risk students identified either through brief screening in health care or other campus settings (indicated prevention) or through membership in an identified risk group. Careful attention to the marketing of these services and the provision of incentives for participation is also recommended. Focus groups with students on each campus to develop materials and marketing strategies may help maximize recruitment and retention of students. Partnering with psychology, sociology, public policy, public health, education or social work departments or institutional research offices on campus to obtain technical assistance in conducting and evaluating these efforts may be one viable strategy for accomplishing these aims. Finally, understanding that individually oriented prevention and treatment services are only one piece of the puzzle is important. Fostering a campus climate supportive of prevention efforts through collaborations with policy-makers, judicial and disciplinary officers, law enforcement personnel, student affairs staff, health care staff and other stakeholders, to best support prevention efforts, is necessary.

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