CAPT Decision Support Tools

Strategies to Prevent Binge or Heavy Episodic Drinking Among Adolescents and Young Adults

Using Prevention Research to Guide Prevention Practice

SAMHSA's Center for the Application of Prevention Technologies
January, 2015

Revised with New Section on College/Campus Populations

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This document was developed under the Substance Abuse and Mental Health Services Administration's Center for the Application of Prevention Technologies contract. Reference #HHSS283201200024I/ HHSS28342002T. For training and technical assistance use only.

Substance Abuse and Mental Health Services Administration
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INTRODUCTION

As part of a strategic planning process, practitioners need to select prevention strategies or interventions that address those risk and protective factors associated with their prioritized substance-related problem(s). This document summarizes evaluations of prevention strategies and interventions associated with binge or heavy episodic drinking, as identified in the prevention research literature. It also provides recommendations for using the prevention research to inform strategy selection.
Related tools in this toolkit include:

- *Binge Drinking: Terminology and Patterns of Use*
- *Risk and Protective Factors Associated with Binge or Heavy Episodic Drinking Among Adolescents and Young Adults: Using Prevention Research to Guide Prevention Practice*

HOW WE IDENTIFIED THE STRATEGIES INCLUDED IN THIS DOCUMENT

The prevention strategies and interventions included in this document were described in systematic and meta-analytic reviews published between 2007 and 2012. This range of dates was dictated by available resources, as well as the view that more recent (post-2006) reviews would be more relevant for planning current prevention activities. The review focused on U.S. and international samples of adolescents and young adults (including college students), but also includes samples of populations from various age groups (e.g., health care patients or employees) and settings.

The search was conducted using PSYCHINFO, PUBMED, and SocINDEX databases for articles published between 2007 and June 2012. Search terms included "binge drinking" OR "heavy episodic drinking," AND "review" OR "meta*[1]" in combination with these additional terms: "evaluation," "effectiveness," "adolescents," "young adults," "emerging adults," and "college."

Articles were selected based on the following criteria:

- The full text was available in English or with translation.
- The review was published in a peer-reviewed journal or in the Cochrane Database of Systematic Reviews.
- The review had clearly identified methodologies and results.
- At least one of the main findings was specifically related to binge or heavy episodic

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drinking for youth under age 21. Articles that assessed general alcohol use, problem alcohol use, or other alcohol outcomes without any outcomes specific to binge drinking were not included.

- Meta-analyses[2] and systematic reviews[3] examining the level of evidence to support a relationship between exposure to, or participation in specific prevention strategies or interventions and binge drinking.

CAVEATS TO THE SELECTION PROCESS

- The findings are limited to the time frame and search parameters described above.
- Strategies that have not been studied in a systematic literature review or meta-analysis or that remain unpublished in a peer-reviewed journal may not be included in this review.
- In many cases, evaluations of multi-component interventions do not disentangle the effects of a single strategy, making it difficult to attribute specific outcomes with specific strategies.
- The detailed summaries display key, relevant considerations (including some effect sizes, methods for meta-analyses, and inclusion criteria) and major findings for included studies. For more detailed information, the reader is encouraged to review the full text articles on a particular strategy or to consult with an evaluator.

HOW TO USE THESE RESOURCES

Although there are several ways to approach and use these resources, the following are suggested steps or guidelines.

Start with risk and protective factors. While binge or episodic drinking may be a serious problem across your state, the factors that drive the problem in different communities may vary considerably. For example, in one community, high school students may have low perceptions of the risks associated with binge drinking. However, this may not be an important risk factor in another community, where alcohol sales to underage patrons may be a more salient problem. To be effective, prevention strategies or interventions must be linked to the risk and protective factors that drive the problem *in your community.* Therefore, it is critical that you begin your search for appropriate prevention strategies with a solid understanding of these factors, based on a comprehensive review of local quantitative and qualitative data.

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Once the priority risk and protective factors have been identified, you can then use this document to consider potential strategies associated with those factors.

Examine detailed summaries to identify relevant studies. The summaries are designed to help you decide which intervention(s)—if any—best fit your local conditions. Each summary includes: a full citation so you can locate the original article (articles are organized alphabetically, by author); the socio-ecological domain (i.e., individual, relationship, community, and society) that the strategy(s) target; type of strategy implemented (e.g., e-intervention, brief intervention); type of review (meta-analyses or systematic review); number of studies included in the review; description of participants; type of setting; outcome measures (specific survey measures), and key findings. After reviewing all detailed summaries in this document, use the citations provided to access the full-text of the most relevant articles.

Determine evidence of effectiveness. Once you have retrieved and reviewed details of the review supporting the relevant strategy(s) or intervention(s) in which you are interested, you will need to decide whether the evidence of its effectiveness is sufficient. Determining this is beyond the scope of this document, though some issues to consider are discussed in SAMHSA's Center for Substance Abuse Prevention's 2009 *Identifying and Selecting Evidence-Based Interventions Revised Guidance Document for the Strategic Prevention Framework State Incentive Grant Program*. Approaches to weighing the evidence of effectiveness for interventions can also be found in the rating systems such as SAMHSA's National Registry of Evidence-based Programs and Practices. However, most prevention practitioners benefit from the advice of a researcher, evaluator, or others with appropriate training and experience when determining relevance. Fortunately, in responses to conditions of SAMHSA-funded initiatives such as the Strategic Prevention Framework State Incentive Grant, many states have evidence-based workgroups that can help assess the strength of the evidence for an intervention's effectiveness.

Determine the feasibility of implementation. Once you have identified a strategy or intervention that addresses those risk and protective factors associated with binge drinking in your community, and which is supported by sufficient evidence of effectiveness, it is important to determine how feasible it will be to implement, given your resources and community conditions (i.e., the community's willingness and/or readiness to implement). The processes of assessing feasibility and sources that can help with this are discussed in SAMHSA's Center for Substance Abuse Prevention's *Identifying and Selecting Evidence-Based Interventions Revised Guidance Document for the Strategic Prevention Framework State Incentive Grant Program*. Additional resources related to feasibility can be found in the CAPT area of SAMHSA's website.

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What if you can't find an appropriate strategy or intervention? Given the limited number of strategies and interventions identified in this review, you may not be able to identify one that meets your needs—that addresses the risk and protective factors associated with binge drinking in your community, that is supported by sufficient evidence of effectiveness, and that is feasible to implement. If this is the case, keep looking. Consider identifying single, methodologically rigorous evaluation studies or searching databases (in addition to those searched for this review) to retrieve more research articles. Also, consider widening your search to include single, methodologically rigorous evaluation studies (i.e., don't confine to literature reviews or meta-analysis); studies published before and after the time period included in this review: and/or to include studies published in non-refereed journals (many of these use methods as rigorous as studies found in peer-reviewed journals) or studies for which the full-text was not available. Or simply try using more search terms.

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[1] *represents a multiple letter "wildcard character" (e.g., meta* would include the terms: meta-analysis, meta-analytic, meta-analyses)

[2] These typically combine data from multiple quantitative studies that examine the same or similar outcomes and use advanced statistical techniques to generate an overall effect size (i.e., a measure of the strength or magnitude of a relationship between variables). Meta-analyses have specific search criteria to delineate the types of studies included (e.g., controlled trials only, studies within a specific date range). Meta-analysis has some important limitations. Most notably, it assumes well-collected, well-defined data from original studies. Meta-analyses are also impacted by publication bias—meaning that they often do not include work that remains unpublished. Finally, in some meta-analyses the end result could be a final construct that is rendered meaningless because it combines measures that are simply too diverse. However, when properly performed, stronger conclusions may be drawn from meta-analyses than from individual studies (longitudinal or cross-sectional) because these studies reflect consistency of study findings and also often consider the methodological quality of included studies.

[3] These types of reviews seek to synthesize the research related to a particular research question. Systematic reviews clearly articulate the methods used to identify the studies reviewed, including the search criteria (e.g., key word, databases, topic/content, years included, types of studies). Attention is paid to the methodological quality of the studies included, and a well-articulated approach is used to analyze or synthesize study findings. Sometimes a systematic review synthesizes study findings by using meta-analytic techniques; other times, the synthesis is more qualitative in nature. Systematic reviews can be impacted by publication bias—meaning that they often do not include work that remains unpublished.

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Binge or heavy drinking is a critical problem among the U.S. college student population. The list on the following page includes studies found in this search that identify strategies that have been shown to produce positive outcomes in this population. These strategies are also highlighted in light orange throughout the rest of the document. Please note, however, that because this review was not originally designed to identify strategies specific to college students, the list is limited in scope and does not represent an exhaustive review of *all* relevant strategies to prevent binge or heavy drinking among college students.

Study	Page
Strategies tested with U.S. college students directly	
Carey, K. B., Scott-Sheldon, L. A., Carey, M. P., and DeMartini, K. S. (2007). Individual-level interventions to reduce college student drinking: A meta-analytic review. *Addictive Behaviors, 32*, 2469-2494.	8
Carey, K. B., Scott-Sheldon, L. A., Elliott, J. C., Bolles, J. R., and Carey, M. P. (2009). Computer-delivered interventions to reduce college student drinking: A meta-analyses. *Addiction, 104*(11), 1807-1819.	10
Elliott, J., Carey, K., and Bolles, J. (2008). Computer-based interventions for college drinking: A qualitative review. *Addictive Behaviors, 33,* 994-1003.	14
Moreira, M., Smith, L., and Foxcroft, D. (2010). Social norms interventions to reduce alcohol misuse in University or College students. *Cochrane Database Systematic Reviews* (3), CD006748.	21
Scott-Sheldon, L. A., Terry, D. L., Carey, K. B., Garey, L., and Carey, M. P. (2012). Efficacy of expectancy challenge interventions to reduce student drinking: A meta-analytic review. *Psychology of Addictive Behaviors, 26*(3), 393-405.	24
Strategies tested with U.S. college students among other populations	
Elder, R. W., Lawrence, B., Ferguson, A., Naimi, T. S., Brewer, R. D., Chattopadhyay, S. K., Toomey, T. L., and Fielding, J. E. (2010). The effectiveness of tax policy interventions for reducing excessive alcohol consumption and related harms. *American Journal of Preventive Medicine, 38*(2), 217-229.	12
Khadjesari, Z., Murray, E., Hewitt, C., Hartley, S., and Godfrey, C. (2010). Can stand-alone computer-based interventions reduce alcohol consumption? A systematic review. *Addiction*, 106(2), 267-282.	19

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Study	Page
Study	**Page**
Popova, S., Giesbrecht, N., Bekmuradov, D., and Patra, J. (2009). Epidemiology and policy: Hours and days of sale and density of alcohol outlets: Impacts on alcohol consumption and damage: A Systematic Review. *Alcohol and Alcoholism, 44*(5), 500-516.	23
White, A., Kavanagh, D., Stallman, H., Klein, B., Kay-Lambkin, F., Proudfoot, J, Drennan, J., Connor, J., Baker, A., Hines, E., and Young, R. (2010). Online alcohol Interventions: A systematic review. *Journal of Medical Internet Research, 12*(5), e62.	28

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Records highlighted in light orange identify strategies shown to produce positive outcomes among U.S. college populations.

Carey, K. B., Scott-Sheldon, L. A., Carey, M. P., and DeMartini, K. S. (2007). Individual-level interventions to reduce college student drinking: A meta-analytic review. *Addictive Behaviors, 32*, 2469-2494.

Domain	Individual
Strategy/Intervention	Individual-level alcohol risk reduction interventions designed to reduce alcohol use among college students. Methods of delivery included group, individual, and web-based. Motivational interviewing techniques were used in nearly half of the interventions. Types of interventions included: alcohol/blood alcohol concentration education, normative comparisons, and feedback on consumption.
Study Type	Meta-analysis of 62 randomized controlled trials (RCTs) conducted by deriving weighted mean effect sizes for alcohol interventions versus comparison conditions for consumption variables and alcohol-related problems over four measurement intervals. Reported on between-groups (i.e., treatment group and control group) effects, effect sizes for multiple consumption variables and for alcohol-related problems, and effect sizes separately for follow-ups of different durations.
Studies Included	62 RCTs with 98 intervention conditions published between 1985 and early 2007. Studies were included if they: (a) examined any educational, behavioral, or psychological alcohol intervention; (b) sampled college or university students; (b) used a randomized controlled trial; (c) assessed drinking behavior (e.g., frequency or quantity); and (d) provided sufficient information to calculate between-group effect size estimates.
Study Participants	College students (N=13,750)
Settings	College campuses predominately located in the United States.
Outcomes	Alcohol consumption including frequency and quantity; measures of intoxication.

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Key Findings

When assessed at follow-up intervals lasting up to six months, participants in risk reduction interventions drank significantly less compared to controls (e.g., wait-list/assessment only or standard education). Students receiving interventions also reported fewer alcohol-related problems over longer intervals. A review of moderator variables suggests that individual, face-to-face interventions that use motivational interviewing and personalized normative feedback predict greater reductions in alcohol-related problems when compared to other interventions.

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Carey, K. B., Scott-Sheldon, L. A., Elliott, J. C., Bolles, J. R., and Carey, M. P. (2009). Computer-delivered interventions to reduce college student drinking: A meta-analyses. *Addiction, 104*(11), 1807-1819.

Domain	Individual
Strategy/Intervention	Pre-and post-test computer-delivered interventions (CDIs) designed to reduce alcohol use among college students. Methods of delivery included self-directed, group-delivered, computer and group sessions, and computer and in-person sessions. The most common types of CDIs included: consumption feedback (quantity of alcohol consumed, average spent on alcohol, etc.), normative comparisons (e.g., beliefs about peers drinking, amount consumed in relation to peers), alcohol education, and tailored materials.
Study Type	Meta-analysis to evaluate the effectiveness and moderators of CDIs on reducing alcohol use among college students. Calculated both between-group (i.e., treatment group and control group) and within-group (i.e., pre-test and post-test) effect sizes for alcohol consumption and alcohol-related problems. Effect sizes were also calculated for short-term (<5 weeks) and longer-term (>6 weeks) intervals. Characteristics of the studies, samples, intervention, and study quality were included in predictive models of alcohol consumption. The effects of the intervention were evaluated for alcohol-related problems at short-term and frequency of heavy drinking at long-term compared with control conditions.
Studies Included	35 manuscripts with 43 separate interventions published between 2000 and 2008. Studies were included if they (a) examined an alcohol-related intervention delivered via computer or electronic device (e.g., text messages), (b) sampled undergraduate college students, (c) assessed behavioral outcomes, and (d) provided sufficient information to calculate effect sizes.
Study Participants	College students (N=28,621)
Settings	College campuses and off-site locations with access to computer technologies (internet, intranet, or CD-ROM/DVD).
Outcomes	Alcohol consumption variables including: (a) quantity consumed over time (e.g., week, month), (b) quantity per drinking occasion, (c) maximum quantity consumed on one occasion, (d) frequency of heavy drinking (usually defined as ≥5 drinks for men and ≥4 drinks for women, and (e) frequency of drinking days; alcohol-related problems.

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Key Findings

The effects of the computer-delivered intervention depended on the nature of the comparison condition. Relevant comparison conditions varied with regard to content and intensity. Controls were categorized as having relevant content (i.e., alcohol-related content including education only) vs. non-relevant content (i.e., wait-list/assessment only or content unrelated to alcohol use). CDIs reduced the quantity and frequency measures compared to assessment-only controls (i.e., assessed but not involved in treatment), but rarely differed from comparison conditions that included alcohol content. Small to medium within-group (i.e., pre-test and post-test) effect sizes can be expected for CDIs at short- and longer-term follow up.

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Domain	Community
Strategy/Intervention	Taxes on or price of alcohol.
Study Type	Systematic literature review of 72 papers or technical reports to assess the effectiveness of alcohol tax policy interventions for reducing excessive alcohol consumption and related harms. This review was conducted for the Centers for Disease Control and Prevention's (CDC) Guide to Community Preventive Services (also known as the Community Guide).
Studies Included	72 papers or technical reports published prior to July 2005. To be considered for inclusion in the review, studies had to (a) meet minimum Community Guide standards for study design and quality; (b) be published in an English-language journal, book chapter, or technical report; (c) be conducted in a high-income economy; and (d) evaluate independent variables and outcome measures of interest. In addition, the study had to evaluate either the effects of a change in alcohol tax policy or the relationship between alcohol taxes or prices and outcomes of interest (i.e., direct measures or proxies related to excessive alcohol consumptions and harmful consequences).
Study Participants	High school students, college students, young people in the general population, and adults in the general population from the United States and other countries.
Settings	N/A (varied considerably).
Outcomes	Overall alcohol consumption at the societal level (e.g., total alcohol sales) and at the individual level (e.g., self-reported binge drinking), drinking patterns, and alcohol-related harms (e.g., morbidity, chronic disease, intentional and unintentional injuries, alcohol-impaired driving, motor-vehicle crashes).

Key Findings

Nearly all studies, including those across age groups found an inverse relationship between the tax or price of alcohol and measures of excessive drinking or alcohol-related harms. In underage populations, increased taxes were significantly associated with reduced consumption

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and alcohol-related harm. Two Swiss studies examined changes in alcohol consumption following a decrease in prices due to a tax change (30-50% decrease in price) and found that following this price change there was a small (2.3%) increase in prevalence of any drinking, as well as a larger increase in binge drinking (3.4%).

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Domain	Individual
Strategy/Intervention	Computer-based interventions, referred to as electronic interventions (e-interventions), designed to reduce college drinking. Interventions were delivered via the internet or available on CD-ROM/DVD. The format of these interventions varied widely, ranging from brief feedback to extensive educational tutorials.
Study Type	Systematic literature review of 17 randomized controlled trials (RCTs) to assess effectiveness of e-interventions on reducing college drinking. RCTs compared the effectiveness of e-interventions with other commonly used techniques, reading materials, and assessment-only control conditions.
Studies Included	17 RCTs published as of August 2007. Studies were included if: (a) they were RCTs, (b) targeted a college population, and (c) evaluated some form of computerized alcohol intervention.
Study Participants	College students
Settings	College campuses and off-site locations with access to computer technologies (internet, intranet, or CD-ROM/DVD).
Outcomes	Usual alcohol consumption, including heavy drinking episodes.

Key Findings

Findings provide support for e-interventions when compared to other strategies (e.g., reading materials or assessment-only controls). However, findings suggest that effects are typically short-term.

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Foxcroft, D.R. & Tsertsvadzem, A. (2011). Universal multi-component prevention programs for alcohol misuse in young people. *Cochrane Database Systematic Reviews (9)*, CD0099307.

Domain	Individual, Relationship, and Community
Strategy/Intervention	Multi-component prevention programs: **Experimental** - any universal multi-component psychosocial or educational prevention program; multi-component is defined as an intervention that comprises components delivered in different settings, for example both school and family settings; psychosocial intervention is defined as one that specifically aims to develop psychological and social skills in young people (e.g., peer resistance) so that they are less likely to misuse alcohol; educational intervention is defined as one that specifically aims to raise awareness of the potential dangers of alcohol misuse so that young people are less likely to misuse alcohol; studies that evaluated interventions aiming specifically at preventing and reducing alcohol misuse as well as generic interventions (e.g., drug education programs), or other types of interventions (e.g., screening for alcohol consumption) were eligible for inclusion in the review. **Control** - any alternative prevention program (e.g., school-, family-, office-based, multi-component, other) or no program.
Study Type	Updated (from 2002) systematic review of 20 randomized controlled trials (RCTs) evaluating the effectiveness of multicomponent prevention programs (interventions delivered in more than 1 setting) on preventing alcohol misuse among adolescents aged 18 and younger.
Studies Included	20 RCTs that were either identified between the years 2002 to 2010 or previously identified for a similar systematic review in 2002.
Study Participants	Youth 18 years of age or younger attending school
Settings	United States (17 studies), India (1), Netherlands (1), and Australia (1).
Outcomes	Alcohol use (yes/no), alcohol use (quantity, frequency), binge drinking (drinking 5 or more drinks at any one occasion), incidence of drunkenness, alcohol initiation (age), drunkenness initiation (age).

Key Findings

This review found that 12 of the 20 included studies reported statistically significant reductions

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in alcohol use (e.g., weekly drinking, frequency of drinking, binge drinking, heavy use) for students engaged in multi-component interventions when compared to controls. The persistence of effects was seen from 3 months to 3 years for 8 of the 12 studies (the remaining studies only examined outcomes immediately following the intervention). The most common combination of program components was school prevention curricula with a parenting intervention. At least 2 of the 12 studies (Project Northland, Communities that Care) resulted in significant reductions in binge drinking outcomes.

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Foxcroft, D.R. & Tsertsvadzem, A. (2011). Universal school-based prevention programs for alcohol misuse in young people. *Cochrane Database Systematic Reviews (5)*, CD009113.

Domain	Individual
Strategy/Intervention	Universal school-based prevention programs: **Experimental** - any universal school-based psychosocial or educational prevention program; psychosocial intervention is defined as one that specifically aims to develop psychological and social skills in young people (e.g., peer resistance) so that they are less likely to misuse alcohol; educational intervention is defined as one that specifically aims to raise awareness of the potential dangers of alcohol misuse so that young people are less likely to misuse alcohol; studies that evaluated interventions aiming specifically at preventing and reducing alcohol misuse as well as generic interventions (e.g., drug education programs, healthy school or community initiatives), or other types of interventions (e.g., screening for alcohol consumption) were eligible for inclusion in the review. **Control** - any alternative prevention program (e.g., school-, family-, office-based, multi-component, other) or standard curriculum.
Study Type	Updated (from 2002) systematic literature review of 53 randomized control trials (RCTs) that explored the efficacy of universal school-based prevention programs for alcohol misuse in students 18 years of age or younger.
Studies Included	53 RCTs that were either identified between the years 2002 to 2010 or previously identified for a similar systematic review in 2002. Eleven trials that evaluated the effectiveness of universal school-based intervention programs specifically focusing on the prevention of alcohol misuse in young students; 39 trials that evaluated the effectiveness of universal school-based intervention programs with respect to the prevention of multiple factors such as misuse of alcohol, tobacco, drugs, and anti-social behavior in young students; and three evaluated the effectiveness of universal school-based intervention programs whose focus was the prevention of alcohol-cannabis, drug-alcohol, or tobacco only.
Study Participants	Youth 18 years of age or younger attending school

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Settings	United States and Canada (41 studies), Europe: Austria, Belgium, Greece, Italy, Spain, Sweden, Netherlands, Norway, Germany (6), Australia (6), Multiple countries (2), India (1), and Swaziland (1).
Outcomes	Alcohol use (yes/no), alcohol use (quantity, frequency), binge drinking (drinking 5 or more drinks at any one occasion), incidence of drunkenness, alcohol initiation (age), drunkenness initiation (age).

Key Findings

Among the 11 studies that examined the effects of alcohol-specific programs, only one study reported outcomes for binge drinking. This study examined 7th grade students in an intervention condition, an alcohol education program that included four sessions implemented over 3 months as well as separate booklets for students and parents. This study reported significant declines in the risk of lifetime binge drinking at both 4 and 12 month follow-ups.

Among the 39 studies that evaluated the effectiveness of universal school-based intervention programs with respect to the prevention of multiple factors such as misuse of alcohol, tobacco, drugs, and anti-social behavior in youth, two studies demonstrated the efficacy of Life Skills Training (LST) to decrease a measure of drunkenness compared to controls) and a later study found a significant effect of LST to reduce binge drinking (quantified as 5 or more drinks on one occasion) at 1 and 2 year follow-ups. Another study found subgroup differences in binge drinking. One study demonstrated significant reductions in binge drinking (defined as 3+ drinks per occasion) in Hispanics, but not for non-Hispanics at a 2 year follow-up.

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Domain	Individual
Strategy/Intervention	Stand-alone (non-guided) computer-based brief interventions (BIs). While most of the interventions were delivered via web, one study sent tailored text messages and others were available in fixed locations. (e.g., physician's offices). The type of BIs included: personalized feedback on current levels of drinking and comparison with safe drinking limits; variety of virtual interactive games and assignments, motivational feedback, and information on risk taking and refusal skills; a video of people undergoing an alcohol/placebo expectancy-disconfirming experience; and behavior change interventions which included components such as readiness to change, decisional-balance, goal setting, self-monitoring, strategies for behavior change, behavioral contracting with rewards and penalties, maintenance of change and relapse prevention.
Study Type	Systematic literature review of 24 randomized controlled trials (RCTs) to assess the effectiveness of computer-based BIs on reducing alcohol consumption among adults. Most studies compared a computer-based intervention to a minimally active control condition. A variety of methodological weaknesses were highlighted in the studies including using means to summarize skewed data. Conducting sensitivity analyses of studies that used suitable measures for central tendency revealed no differences between intervention and minimally active comparison groups in the weekly alcohol consumption.
Studies Included	24 RCTs published between 1998 and 2008
Study Participants	Participants included students (18 studies), adult problem drinkers from the general population (3), work-place employees (2), and emergency department attendees (1).
Settings	Most interventions were accessed from computers at a location determined by the researchers (16 studies); the remainder were able to access the intervention online at a location and time convenient to them (8).
Outcomes	Various measures across studies including frequency of alcohol consumption, number of drinking days, average drinks per day, proportion of binge days, past 14 and 30-day of binge drinking.

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Key Findings

Eight of the twenty-four studies reported outcomes on the frequency of heavy or binge drinking days or drinking episodes. Five studies (n=848) reported reductions in the frequency of binge drinking for participants in a computer intervention condition compared to those receiving a minimally active intervention (mean diff= -.23). Two studies compared computer interventions to active controls (e.g., provided non-relevant information, education or treatment) and found no significant differences in binge frequency by intervention condition.

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Revised Version (January 24, 2015)

Moreira, M., Smith, L., and Foxcroft, D. (2010). Social norms interventions to reduce alcohol misuse in University or College students. *Cochrane Database Systematic Reviews* (3), CD006748.

Domain	Individual and Community
Strategy/Intervention	Social norms interventions delivered through the following methods: mailed feedback, web computer format, and individual or group face-to-face intervention. Types of social norms interventions included: universal personalized normative feedback (all students are asked to participate regardless of drinker status or risk level), targeted interventions (focusing on members of a particular group), and social norms marketing campaigns (community-wide electronic and/or print media campaigns that refer to normative drinking patterns).
Study Type	Systematic literature review of 22 randomized controlled trials (RCTs) to assess the effectiveness of social norms interventions on reducing alcohol use among college students.
Studies Included	22 RCTs conducted in the United States (19 studies) and New Zealand (3) published between 1998 and 2008.
Study Participants	College students (N=7,275)
Settings	Primarily college universities
Outcomes	Alcohol use and misuse as measured by self-report data (frequency and quantity); binge drinking, calculated peak blood alcohol content (BAC) and drinking norms (drinking norms rating form).

Key Findings

Ten studies reported outcomes for immediate short-term follow-up (up to 3 months post intervention) and six studies reported longer-term outcomes (4-16 months) for binge drinking. Social norms interventions delivered using the web or computer and individual face-to-face or group face-to-face sessions appeared to reduce binge drinking at least in the short-term (up to 3 months following the intervention), with limited support for web or computer delivered social norms interventions for longer-term effects. Additional details regarding the results of this systematic review organized by the delivery method is presented below.

With regard to mailed feedback on social norms, two studies demonstrated that mailed feedback on social norms led to no significant short-term effects on binge drinking. One of these studies examined longer-term follow-ups and failed to find a significant effect of the social norms mailed content on binge drinking.

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With regard to web/computer-delivered social norms content or feedback, one study (n=80) found significant short-term effects of this approach on binge drinking, with 68% of students reporting a reduction in binge drinking. Two studies (n=329) reported a significant reduction of binge drinking at a longer-term follow up with 59% of students reporting reductions in binge drinking.

With regard to individual, face-to-face social norms content and feedback, three studies (n=278) demonstrated a significant short-term effect of this approach, where 60% of participants reported declines in binge drinking. These reductions were not maintained at longer-term follow-ups.

With regard to group face-to-face social norms content and feedback, four studies (n=264) demonstrated a significant short-term effect of this approach, with 65% of students experiencing decreases in binge drinking. None of these studies included follow-up assessments longer than 3 months and therefore conclusions cannot be drawn about the sustainability of these reductions.

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Popova, S., Giesbrecht, N., Bekmuradov, D., and Patra, J. (2009). Epidemiology and policy: Hours and days of sale and density of alcohol outlets: Impacts on alcohol consumption and damage: A Systematic Review. *Alcohol and Alcoholism, 44*(5), 500-516.

Domain	Community
Strategy/Intervention	Alcohol policies focusing on availability of alcohol (e.g., hours and days of sale, new licensing laws), including density of alcohol outlets.
Study Type	Systematic literature review of 44 studies to examine the impact of availability of alcohol on overall consumption, drinking patterns, and alcohol-related health outcomes (e.g., morbidity, chronic disease, intentional and unintentional injuries).
Studies Included	44 studies on alcohol outlet density and 15 studies on hours and days of sale published between 2000 and 2008.
Study Participants	Populations from the United States (36 studies), Australia (8), Canada (5), New Zealand (2), the United Kingdom (2), Brazil (1) Iceland (1), Mexico (1), Norway (1), Sweden (1), and Switzerland (1).
Settings	The studies took place in various countries including the United States (including California, Florida, Louisiana, Massachusetts, Michigan, Minnesota, Missouri, New Jersey, New Mexico, New York, Ohio, and Texas), Australia, Canada, New Zealand, United Kingdom, Brazil, Iceland, Mexico, Norway, Sweden, and Switzerland.
Outcomes	Overall alcohol consumption, drinking patterns, and alcohol-related health outcomes (e.g., morbidity, chronic disease, intentional and unintentional injuries); alcohol-related motor-vehicle crashes.

Key Findings

The review found that higher density of alcohol outlets was associated with greater quantity consumed among drinkers in Louisiana. A study of economically deprived neighborhoods in Los Angeles failed to find a relationship between alcohol availability and heavy drinking.

Another two studies found a significant association between high density of alcohol outlets and drinking outcomes among U.S. college students. In the first of these two studies, higher density was related to high-risk drinking (defined as consuming 5+ drinks) at off-premise parties. In the second study, high on-premise alcohol density was highly correlated with the average number of drinks per party, and the number of drinking occasions in the past 30 days.

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Scott-Sheldon, L. A., Terry, D. L., Carey, K. B., Garey, L., and Carey, M. P. (2012). Efficacy of expectancy challenge interventions to reduce student drinking: A meta-analytic review. *Psychology of Addictive Behaviors, 26*(3), 393-405.

Domain	Individual
Strategy/Intervention	Expectancy Challenge (EC) group interventions. These are designed to illustrate the effects of alcohol-related expectancies on drinking outcomes. In a typical EC intervention, a group of individuals are brought into a research lab designed to look like a bar and are provided with either an alcoholic beverage or a placebo. The participants are then asked to engage in social interactions and judge whether others in the group are drinking alcohol or a non-alcoholic placebo. EC interventions have also been adapted using didactic presentations instead of experimental presentations.
Study Type	Meta-analysis of 14 studies that measured 19 EC interventions (both experimental and didactic) and their effects on alcohol expectancies and consumption. Effect sizes (*d*) for between group (i.e., treatment group and control group) and within-group (i.e., pre-test and post-test) were calculated. For between-groups differences, positive effect sizes indicate that participants receiving an EC intervention reported the intended effects (lower positive alcohol expectancies, higher negative alcohol expectances, and less alcohol consumption compared with controls). For within-group changes, positive effect sizes indicate that participants reported lower positive alcohol expectancies, higher negative expectancies, or consumed less alcohol at posttest relative to their pretest scores.
Studies Included	14 studies (N=1,415) published through June 2010. Studies were included if they (a) examined a behavioral intervention to reduce alcohol-related expectancies,1 (b) sampled college students, (c) used a randomized controlled trial or a quasi-experimental design with a control condition or a within-group design reporting pre- and posttest outcomes, (d) assessed alcohol expectancies, and (e) provided information needed to calculate effect sizes.
Study Participants	College students
Settings	Large public universities in the United States (11 studies), the Netherlands (2), and Sweden (1).
Outcomes	Alcohol use, alcohol expectancies, frequency of heavy drinking (5+ drinks for men and 4+ drinks for women).

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Key Findings

Results indicate that there was a small effect of EC interventions on reducing the quantity of alcohol consumed (*d*=.23 [.08, .38]). Among the five studies that measured frequency of heavy drinking (or binge drinking, as defined by 5+ drinks for men and 4+ drinks for women), the authors found that EC interventions also demonstrated a small effect on these outcomes(*d*=.27 [.06, .47]). The frequency of binge drinking was significantly reduced at the 1-month follow-up, but was not sustained at longer follow-ups (up to 6 months).

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Tait, R. J., and Christensen, H. (2010). Internet-based intervention for young people with problematic substance use: A systematic review. *Medical Journal of Australia, 192*(7), S15-S21.

Domain	Individual
Strategy/Intervention	Web-based interventions delivered to adolescents and young adults. Types of interventions included: web-based education courses with feedback, assessment with feedback, and personalized normative feedback.
Study Type	Systematic literature review of 13 randomized controlled trials to assess web-based interventions.
Studies Included	13 randomized controlled trials published in peer-reviewed journals through 2009 that examined fully-automated web-based interventions. Studies that included other components that were not web-based (e.g., an in-person MI component) were excluded. Studies were included if (a) they used a randomized design to compare a web-based intervention with at least a no-treatment control, (b) the age groups were adolescents (typically targeted via interventions delivered through schools) or young adults (i.e., specifically targeting tertiary students or other people aged 25 years or less), and (c) outcomes included a measure of consumption of the target substance, not just change in attitude.
Study Participants	Adolescents and young adults (less than 25 years old) from Australia, New Zealand, United States, and United Kingdom who were at risk for problem drinking.
Settings	N/A
Outcomes	Measures of consumption (e.g., alcohol use by young adults, frequency of binge drinking).

Key Findings

Seven of the thirteen studies reviewed heavy or binge drinking among young adults and found medium effects of web-based interventions (d=-.35; SE .15; 95% CI -.64 to -.06) on reducing binge drinking. However, results from these seven individual studies showed significant heterogeneity, indicating a range of findings across studies. The authors noted that some of the web-based programs were more intensive compared to other brief web-based interventions and that the intervention's greater intensity may have accounted for some of these differences. The majority of outcomes were reported only up to 3 months. Longer-term effects were not known. There is no evidence that web-based interventions prevent problem drinking behaviors among students who do not currently drink.

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Revised Version (January 24, 2015)

Wachtel, T., and Staniford, M. (2010). The effectiveness of brief interventions in the clinical settings in reducing alcohol misuse and binge drinking in adolescents: A critical review of the literature. *Journal of Clinical Nursing, 19*(5-6), 605-620.

Domain	Individual
Strategy/Intervention	Brief interventions (BIs) with short (up to six months), medium (6-12 months), and long-term (longer than 12 months) follow-up. Motivational interviewing (MI) techniques were used in nearly all interventions. Other methods of delivery included interactive lap-top computer scenario and an audio-session scenario about alcohol misuse. Types of interventions included (but not limited to) alcohol education, personalized feedback, informational handouts, goal setting, and video with discussion.
Study Type	Systematic literature review of 14 randomized controlled trials (RCTs) to examine the effectiveness of brief interventions designed to reduce alcohol consumption among adolescents. A total of 2,114 participants were either randomized to an alcohol intervention condition or a control condition.
Studies Included	14 RCTs studies published between 1998 and 2008**.** Studies were included if (a) they were RCTs, (b) published in English, and (c) included brief intervention strategies specific to alcohol or alcohol-risk reduction.
Study Participants	Australian adolescents ages 12 to 25 (N=2,114)
Settings	Colleges or universities (7 studies), hospital emergency departments (4), healthcare clinic (1), and youth service center (1).
Outcomes	Frequency of alcohol consumption, amount of alcohol consumed

Key Findings

Twelve of the studies used an MI style of intervention and seven of these reported a reduced alcohol frequency and amount; two reported a reduction in binge drinking episodes, seven reported a decrease in harmful alcohol effects. Short-term follow-up results were positive for the studies using MI and were mainly in the areas of harm reduction (e.g., less drinking and driving, traffic violations, etc.). Another study examined the efficacy of an interactive computer program in the emergency department compared to a control condition. Results demonstrated short-term reductions in binge drinking rates at 3 months post-intervention, but demonstrated that the rates of binge drinking returned to baseline levels at later follow-ups.

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White, A., Kavanagh, D., Stallman, H., Klein, B., Kay-Lambkin, F., Proudfoot, J, Drennan, J., Connor, J., Baker, A., Hines, E., and Young, R. (2010). Online alcohol Interventions: A systematic review. *Journal of Medical Internet Research, 12*(5), e62.

Domain	Individual
Strategy/Intervention	Online alcohol interventions. Types of interventions included brief personalized feedback (e.g., personalized normative feedback, motivational feedback, etc.) and multi-session modularized programs that include information/education treatment (often incorporating personalized feedback).
Study Type	Systematic literature review of 17 randomized controlled trials (RCTs) to assess effectiveness of online alcohol interventions on reducing alcohol consumption.
Studies Included	17 RCTs published between 1998 and 2010. Studies were included if (a) the primary intervention was delivered and accessed via the Internet; (b) the intervention focused on moderating or stopping alcohol consumption; and (c) the study was a randomized controlled trial of an alcohol-related screen, assessment, or intervention.
Study Participants	University students (12 studies) and general company employees or community members with median age of 43.1 years (11 studies) at-risk for problem drinking or identified as heavy or binge drinkers.
Settings	N/A
Outcomes	Frequency and amount of alcohol consumption

Key Findings

Eleven of the seventeen studies focused on individuals who demonstrated at-risk, heavy, or binge drinking behaviors (the definition of these terms was variable, but most often ranged between 4+ or 6+ drinks per occasion or drinking to intoxication).Those who participated in online alcohol interventions (whether only involving brief personalized feedback or comprising multiple modules) showed a small but meaningful change in the amount of alcohol consumed, blood alcohol content, and a range of other alcohol-related measures. These interventions appeared to be more effective than assessment alone or general education about alcohol.

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