Alcohol Electronic Screening and Brief Intervention: A Community Guide Systematic Review

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Abstract

Context—Excessive drinking is responsible for 1 in 10 deaths among working-age adults in the U.S. annually. Alcohol screening and brief intervention (ASBI) is an effective, but underutilized, intervention for reducing excessive drinking among adults. Electronic screening and brief intervention (e-SBI) uses electronic devices to deliver key elements of ASBI, and has the potential to expand population reach.

Evidence acquisition—Using Community Guide methods, a systematic review of the scientific literature on the effectiveness of e-SBI for reducing excessive alcohol consumption and related harms was conducted. The search covered studies published from 1967 to October 2011. A total of 31 studies with 36 study arms met quality criteria, and were included in the review. Analyses were conducted in 2012.

Evidence synthesis—Twenty-four studies (28 study arms) provided results for excessive drinkers only and seven studies (eight study arms) reported results for all drinkers. Nearly all studies found that e-SBI reduced excessive alcohol consumption and related harms: nine study arms reported a median 23.9% reduction in binge drinking intensity (maximum drinks/binge

episode) and nine study arms reported a median 16.5% reduction in binge drinking frequency. Reductions in drinking measures were sustained for up to 12 months.

Conclusion—According to Community Guide rules of evidence, e-SBI is an effective method for reducing excessive alcohol consumption and related harms among intervention participants. Implementation of e-SBI could complement population-level strategies previously recommended by the Community Preventive Services Task Force for reducing excessive drinking (e.g., increasing alcohol taxes and regulating alcohol outlet density).

Context

Excessive alcohol consumption is responsible for approximately 88,000 deaths, including 1 in 10 deaths among working-age adults, in the U.S. each year, costing nearly $250 billion in 2010.[1–5] Binge drinking (i.e., 4 drinks for women and 5 drinks for men, per occasion) is responsible for more than half of the deaths, two thirds of the years of potential life lost, and three quarters of the economic costs of excessive drinking.[5,6] Furthermore, about one in six U.S. adults report binge drinking an average of four times a month, consuming an average of eight drinks per binge episode.[5] Excessive drinking is also associated with a wide range of health and social problems, including motor vehicle crashes, violence, sexually transmitted diseases, fetal alcohol spectrum disorder, cancers, heart disease, and unintended pregnancy.[6–9] Yet 90% of adult excessive drinkers do not meet the Diagnostic and Statistical Manual of Mental Disorders-IV criteria for alcohol dependence.[10]

Alcohol screening and brief intervention (ASBI) is a highly effective strategy for reducing excessive drinking among adults. Traditional ASBI is usually provided in clinical settings, involving screening for excessive alcohol use and providing excessive drinkers with a brief intervention usually lasting 5–15 minutes.[11–13] Screening tools to assess drinking patterns range from a single-question screen for binge drinking to longer screening tools, such as the Alcohol Use Disorders Identification Test (AUDIT).[14–16] Those who are found to have alcohol use disorders can be referred to specialized treatment.

In 2004 and 2013, the U.S. Preventive Services Task Force recommended the use of ASBI for adults in primary care settings.[17] In 2006, the National Commission on Prevention Priorities ranked ASBI fourth in a priority listing of clinical preventive services because ASBI was shown to effectively reduce the high preventable burden of excessive drinking and to be cost-effective.[18] Since 2010, the Affordable Care Act has required new health insurance plans to cover ASBI without a co-payment based on strong scientific evidence of intervention effectiveness.[19] Reducing the proportion of adults who drink excessively and the proportion of adults who engage in binge drinking, and increasing the number of Level I and Level II trauma centers and primary care settings that implement ASBI, are also health objectives in *Healthy People 2020*.[20]

Despite the scientific evidence of ASBI effectiveness for reducing excessive drinking among adults, it is underutilized in clinical practice.[21,22] A recent study reported that only 16% of U.S. adults and 25% of adult binge drinkers reported *ever* discussing alcohol use with a health professional, showing little change since 1997.[13] Furthermore, only about one third of adults who reported binge drinking 10 times in the past month had *ever* discussed their

alcohol consumption with a health professional.[13,23] Common barriers to implementing ASBI in clinical settings include time constraints, lack of training, and self-efficacy.[13,24]

Alternative methods for delivering key elements of ASBI using electronic tools (e.g., computers and phones), referred to as *electronic screening and brief intervention* (e-SBI), have been developed. By reducing the amount of time required to deliver ASBI services, e-SBI could increase the uptake and reduce the costs of this service. These electronic tools may also help individuals who might otherwise be reluctant to discuss their drinking behavior with a health professional. Additionally, e-SBI can be delivered in community settings (e.g., home or school), which could increase the reach of and exposure to this intervention.

This Community Guide review focused on e-SBI interventions that are similar in structure and intent to ASBI and examined how e-SBI effectiveness varied by key intervention characteristics, in contrast to previous systematic reviews of e-SBI.[25,26] In the review by Donoghue et al.,[25] the authors did not objectively define limits pertaining to the human interaction component of e-SBI in the inclusion criteria and only stratified the findings by intervention length. Moreover, the authors assessed changes in grams of ethanol per week, but did not examine e-SBI effects on other measures of alcohol use that may have greater relevance to health outcomes, such as binge drinking. Dedert et al.[26] stratified the findings by students and adults and intervention length but not by other relevant characteristics. With different search strategies between the present review and those by Donoghue et al.[25] and Dedert et al.,[26] less than one fifth of the studies included in this review were included in the other reviews. This review is unique in that it excluded highly interactive interventions (i.e., those with more than three human-to-human sessions); those that were part of a treatment program for alcohol use disorders; those that were primarily educational programs (e.g., Alcohol Edu, College Alc); and those that only used an electronic device for monitoring drinking following traditional ASBI.

Evidence Acquisition

Community Guide methods for conducting systematic reviews and for developing evidence-based recommendations have been described elsewhere,[27,28] and this review aligns with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) standards.[29] Descriptions of the conceptual approach and methods for this systematic review, including intervention selection and outcome determination, follow.

Systematic Review Development Team

The e-SBI systematic review team[a] included representation from the Community Preventive Services Task Force (Task Force), an independent, nonfederal, unpaid panel of experts in public health and preventive medicine. Other team members included subject matter experts in ASBI, epidemiology and prevention of excessive alcohol use, and systematic review

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methods from The Community Guide and other government agencies and academic institutions.

Conceptual Approach and Analytic Framework

Intervention definition—e-SBI to reduce excessive alcohol consumption uses electronic devices (e.g., computers, telephones, or mobile devices) to facilitate the delivery of key elements of traditional ASBI (as discussed in Context). At a minimum, e-SBI involves:

1. *Screening* individuals for excessive drinking, and

2. Delivering a *brief intervention (BI)*, which provides personalized feedback about the risks and consequences of excessive drinking.

Personalized feedback can be fully automated (e.g., computer-based); interactive (e.g., provided by a person via telephone); or partially automated and interactive. At least one part of the BI must be delivered by an electronic device.

The BI provided using e-SBI techniques may also include other common elements of traditional ASBI. One such element is motivational feedback, which has two levels: Low-level motivational feedback includes general advice on how to reduce excessive alcohol consumption; high-level feedback provides more individually tailored messages based on factors such as readiness to change or developing personal goals. Another element is normative feedback, comparing an individual's own alcohol consumption with that of others (e.g., college students in the same school).

The primary aims of this review were to assess whether e-SBI reduces the prevalence, frequency, and intensity of adult binge drinking (which is reported by more than 90% of U.S. adult excessive drinkers),[10] as well as alcohol-related harms. Secondary aims were to examine how e-SBI effectiveness varies by characteristics of the intervention, population, and setting.

Figure 1 illustrates the conceptual model developed by the review team (i.e., the authors) to indicate the causal pathways through which e-SBI, an individual-level intervention, is expected to reduce excessive alcohol consumption and related harms. The model for this review posits that implementation of e-SBI will increase the number of people screened for excessive drinking, and that those who screen positive will receive a BI. A BI can lead to increased awareness of the harmful consequences of excessive drinking, which may motivate excessive drinkers to reduce their alcohol consumption, yielding a decrease in alcohol-related harms. A small proportion of those who screen positive for excessive drinking may be found to be alcohol-dependent and referred to treatment.

Inclusion criteria—To be included in the systematic review, studies had to (1) evaluate an intervention meeting the definition of e-SBI; (2) be based on primary research published in an English-language journal, or be available as a dissertation or a technical or government report; (3) be conducted in a high-income country as defined by the World Bank[30]; (4) include a concurrent comparison group; (5) report at least one outcome of interest: excessive alcohol consumption or alcohol-related harms; and (6) include a follow-up period >1 month.

Exclusion criteria—Studies were excluded from this review if the interventions (1) were not considered brief (i.e., included more than three sessions with human-to-human interactions); (2) were delivered as part of a treatment program for alcohol use disorders or as part of a broad alcohol education program; (3) involved a multifaceted health risk assessment addressing health behaviors beyond alcohol, tobacco, or other substance use; or (4) only used electronic devices to assess changes in alcohol consumption after delivering traditional ASBI.

Search for Evidence

Electronic searches for literature published from 1967 to October 2011 were conducted in the following databases: CINAHL, EconLit, Embase, ERIC, MEDLINE, NTIS, PsycINFO, Social Services Abstracts, Sociological Abstracts, Web of Science, Dissertation Abstracts, and PubMed to identify studies relevant to evaluations of e-SBI interventions. Search details are available at www.thecommunityguide.org/alcohol/supportingmaterials/SSeSBI.html. References in all retrieved articles were examined, and additional studies identified by subject matter experts on the e-SBI systematic review team were incorporated into the review.

Assessing and Summarizing the Body of Scientific Evidence on Effectiveness

Two abstractors independently read and evaluated each study. Data from all studies that met the systematic review criteria were abstracted using an adaptation of the standardized abstraction form (original form at www.thecommunityguide.org/about/methods.html) and coders reconciled discrepancies. Community Guide criteria for quality of study execution evaluated threats to validity such as poor description of the intervention, study population, or sampling frame; high attrition (>20%); or comparison groups not being comparable at baseline. Based on these criteria, studies were categorized as having good (0–1 limitations), fair (2–4), or limited (>4) quality of execution.[27,28] Studies judged to be of limited quality of execution were excluded from the analysis.

Outcomes of Interest

Several categories of outcome measures were abstracted and summarized for the systematic review. Three binge drinking measures, defined by the researchers in their respective studies, were assessed: prevalence (based on proportions of study participants); frequency (episodes per month); and intensity (peak alcohol consumption [maximum drinks/binge episode]) or the maximum estimated blood alcohol concentration (BAC) during a binge episode. Two general consumption measures were also assessed—frequency of alcohol consumption (number of drinking days/month) and total alcohol consumption (mean number of drinks/month—as well as a measure of average drinks per drinking day. To improve comparability across studies, drinking measures were converted into standard U.S. drinks (i.e., 14 grams of pure alcohol/drink).

Data Analysis and Effect Estimate Calculation

Effect estimates were expressed as relative percent changes, using the following formula:

$$[(I_{post}/C_{post}) \times (C_{pre}/I_{pre})-1] \times 100$$

where I_{post} is the posttest measure for the group receiving the intervention, I_{pre} is the pretest measure for the group receiving the intervention, C_{post} is the posttest measure for the comparison/control group, and C_{pre} is the pretest measure for the comparison/control group. If a study reported multiple follow-up measurements, then the last follow-up period up to 12 months was used to assess intervention effectiveness. If the outcomes reported in a study could not be expressed as a relative percent, then the team qualitatively examined the evidence for direction of effect.

Effect estimates were summarized across studies using medians to reflect central tendencies and interquartile intervals (IQIs) to reflect variability when an adequate number of data points were available (5). Effect estimates were reported and summarized separately for study samples that consisted solely of people who screened positive for excessive drinking and for those that included a combination of all types of drinkers, whether or not they met criteria for excessive drinking at baseline (referred to as "all drinkers").

Evidence Synthesis

Intervention Effectiveness

In total, 8,328 titles and abstracts were obtained (Figure 2). After removing duplicates and studies that did not met the inclusion criteria, 37 studies that evaluated effectiveness of e-SBI for reducing excessive alcohol consumption and related harms were considered for this review. Six studies were excluded for limited quality of execution.[31–36] The remaining 31 studies with 36 study arms were included in this review.[37–67] All included studies were RCTs; 24 had fair quality of execution[38,39,41,43–53,55–57,60,61,63–67] and seven had good quality.[37,40,42,54,58,59,62] Eighteen studies had follow-up periods of 6–12 months.[37,39,40,43,46,47,49–55,59,60,64,65,67] Twenty-four studies (28 study arms)[37,39,40,42,43,46–54,57–65,67] provided results for excessive drinkers only (excessive drinking criteria varied across studies), and seven studies (eight study arms)[38,41,44,45,55,56,66] reported results for all drinkers. Details of the included studies are available at www.thecommunityguide.org/alcohol/supportingmaterials/SETeSBI.pdf. Analyses were conducted in 2012.

Appendix Table 1 (available online) summarizes study arm characteristics. Approximately half of the studies were conducted outside the U.S.[37–40,43,46,47,52–54,59–61,64] and half in university settings.[37,38,41,43–45,47,48,52,55,58,63,65,66] Nearly two thirds of the studies used probability sampling designs or attempted to recruit everyone willing to participate.[37,39,40,43,44,46,47,52–59,62,64–67] In approximately 60% of the studies, participants were screened for excessive consumption through automated methods—most often web-based.[38,44,47,49,52–55,58–67] Over 80% of the BI were delivered solely through automated methods.[37,38,40–45,47–56,58–64,66] Overall, 42% of the BI included high-level motivational feedback (described in Appendix Table 1, available online).[37,39,49–51,57–60,62,65,67] In addition, two thirds of the interventions incorporated normative feedback that compared

drinking patterns among individuals with similar characteristics,[38,40–45,47,49,50,52–55,58,59,61,63,65–67] sometimes in addition to motivational feedback. In most cases, comparison groups were assessed and given a brochure with general alcohol facts.

Summary effect estimates showed reductions in all alcohol consumption outcomes (Table 1). Among excessive drinkers, the largest and most consistent changes were in frequency (median 16.5% reduction in episodes/month) and intensity of binge drinking (median 23.9% reduction in peak alcohol consumption). Peak alcohol consumption also declined in studies that included binge and non-binge drinkers in the intervention condition. Reductions in outcomes related to monthly alcohol consumption were found for studies of excessive drinkers, as well as all drinkers. Although point estimates for average number of drinks per drinking day were in the favorable direction, several studies of excessive drinkers produced nonsignificant effect estimates in the unfavorable direction.[37,42,47,49,54] These studies reported that alcohol consumption decreased in the intervention groups; however, reductions in consumption were greater in the comparison groups. Two additional studies that assessed alcohol consumption outcomes using metrics that could not be combined with those presented in Table 1 also showed favorable intervention effects.[51,59]

Several studies showed that e-SBI had favorable effects on the prevalence of binge drinking and high monthly alcohol consumption. Eight studies assessed drinking prevalence,[39,40,48,52,59,60,62,67] of which five showed a median reduction of 3.2% in binge drinking[39,48,52,62,67] and three showed a median reduction of 12.2% in high monthly alcohol consumption.[40,59,60] Data from two prevalence studies could not be included in the aggregated results owing to distinct reporting measures; however, both indicated that the intervention group participants were more likely to become non-excessive drinkers than the controls.[46,64]

Fourteen studies (17 study arms)[38,41,44,48,51–55,57,58,63,65,66] assessed the impact of e-SBI on alcohol-related harms (e.g., social, academic, and health) using self-reported alcohol problem scales. The most commonly used scale was the AUDIT,[68] which assesses quantity, frequency, and consequences of drinking. AUDIT scores range from 0 – 40, with a score 8 indicating harmful drinking. Three studies (four study arms) that assessed AUDIT scores for excessive drinkers found a median reduction of 1.1 points from a median baseline of 14.8.[49,53,57] Similar favorable results were found for one study that assessed AUDIT score outcomes for all drinkers, finding a 0.9 point reduction from a baseline of 6.4.[41] Similar results were found for other alcohol-related problem composite scales (e.g., RAPI [Rutgers Alcohol Problem Index]), with 12 of 17 study arms showing results in the favorable direction, seven of which were statistically significant ($p<0.05$).[44,51,53,54,57,65,66]

Assessment of effect modification—Table 2 shows intervention effect estimates for average drinks per drinking day stratified by descriptive variables identified by the review team as potential effect modifiers. The team selected average number of drinks/drinking day for stratified analyses because it was a commonly reported outcome measure, reported in 14 study arms.[37–39,41,42,48,49,52–54,58,62,63] Effect estimates were in the favorable direction across all strata, with few clear differences across strata. It is noteworthy that the

intervention effect for studies with universal or probability samples appears larger than for those with convenience samples. The former provides the best estimates of the expected effects of an intervention that is brought to scale in a particular setting.

Studies with treated comparison groups—Three studies compared effectiveness of e-SBI with traditional ASBI and found mixed results.[58,65,67] One study[67] found a 16.4% greater decrease in the proportion of people in the e-SBI group who engaged in binge drinking compared with ASBI. However, another study[58] reported a lower effectiveness of e-SBI compared with ASBI, with 15.1% more drinks consumed per drinking occasion in the e-SBI group. The third study[65] compared an e-SBI combination of Internet and face-to-face to ASBI alone, and reported a 29.5% greater reduction of average drinks per drinking occasion for e-SBI, relative to ASBI alone.

Three studies compared different forms of e-SBI feedback (e.g., personalized feedback to high-level motivational feedback), finding mixed evidence of effectiveness.[47,64,65] Two studies[64,65] found that motivational feedback interventions were associated with greater reductions in alcohol consumption and related problems compared with personalized feedback alone. The third study[47] showed a 13.7% reduction in mean number of drinks/month, but a 2.4% increase in estimated peak BAC in the motivational feedback intervention compared with personalized feedback only. Because of limited evidence, further research is needed to determine whether motivational feedback interventions are associated with greater reductions in alcohol consumption.

Economic Evaluation

Evaluations of economic efficiency are conducted if the Task Force recommends an intervention. The methods and findings of the economic evaluation of alcohol e-SBI interventions to reduce excessive alcohol consumption are described in the Appendix, available online.

Conclusions

Summary of Findings

Based on the studies in this review, study participants who received e-SBI consistently reported greater reductions in excessive alcohol consumption than controls. The impact of e-SBI on excessive drinking was most pronounced for measures of binge drinking frequency and intensity (particularly measures of peak consumption), and less pronounced for average consumption. However, some of these differences in intervention effectiveness may be due to differences in the prevalence of various drinking patterns (e.g., binge drinking versus heavy drinking), and their sensitivity for evaluating changes in excessive alcohol consumption in various study populations. In studies including all drinkers, and not limited to excessive drinkers, the effectiveness of e-SBI for reducing binge drinking is less pronounced, which may partially be due to differences in the study populations. In addition, the effects of e-SBI on measures of alcohol-related harms, using measures such as RAPI scores, were less pronounced; two factors may contribute to this finding. First, measureable reductions in alcohol-related problems first require reductions in alcohol consumption, and

thus, are less directly related to components of e-SBI. Second, categorical scales are inherently less sensitive to change than continuous measures; therefore, some changes in alcohol-related problems may have been missed by use of categorical outcomes.

The trend of the findings of this review are consistent with the findings of other systematic reviews on the effectiveness of e-SBI for reducing excessive alcohol use when measuring changes in grams or drinks of alcohol per week.[25,26] However, the outcomes are not directly comparable because this review examined changes in the number of alcoholic drinks per month. There is little overlap in the other measures included across these e-SBI systematic reviews. For example, Dedert et al.[26] report no significant effects of e-SBI on binge drinking, though the measure refers to rates of binge drinking rather than changes in the frequency or quantity of binge drinking, as reported in the current study.

According to Community Guide rules of evidence,[27] this review found strong evidence that e-SBI is effective in reducing excessive alcohol consumption and related harms. This intervention, which focuses on individual risk reduction, can also be used in conjunction with population-level strategies to reduce excessive alcohol consumption previously recommended by The Community Preventive Services Task Force, including increasing alcohol taxes, regulating alcohol outlet density, and commercial host (dram shop) liability.[69]

Limitations

This review has several limitations. First, alcohol consumption was self-reported, likely resulting in underestimation from recall bias, self-selection bias, and social desirability bias.[37,38,41,42,45,48–51,60,61,63,70,71] Second, the validity of self-reported alcohol consumption may have been affected by the methods used to interview study participants (e.g., face-to-face, telephone, computer), and the reporting of alcohol-attributable outcomes may vary based on survey methods as well.[72–74] Third, as is common in studies of traditional ASBI, studies in this review found substantial reductions in excessive consumption among both intervention and control participants. This is consistent with previous studies that have found that alcohol consumption can be substantially affected by drinking assessments alone.[54] Thus, the impact of e-SBI on excessive drinking might have been even larger if intervention participants had been compared to groups that did not receive either an assessment or a brief intervention for excessive alcohol use. Fourth, exposure to e-SBI may have led participants in the intervention group to report larger changes in their alcohol consumption at follow-up than controls.[52] However, one study[75] found larger reductions in alcohol-related injuries among e-SBI participants at the 12-month follow-up compared to controls, suggesting that e-SBI resulted in larger and sustained reductions in alcohol consumption in the treatment group.

In addition, the quality of some studies was limited because the study populations were not representative of the general population and some had high attrition rates (>20%). Attrition rates tend to be high in e-health studies,[76] including studies evaluating the effectiveness of e-SBI for reducing excessive drinking.[77] To address this problem, many studies conducted intent-to-treat analyses (i.e., applying non-completers baseline data at follow-up), with results that were similar to participants who were retained. Lastly, this review synthesizes literature that was published by October of 2011, consistent with the evidence available

when e-SBI was presented to the Task Force. It is possible that the magnitude of the findings would differ with the inclusion of more recent studies; however, effect estimates from more recent studies[78,79] are consistent with those found in this review, making it unlikely that their inclusion would substantively alter the results reported in this review.

Applicability of Findings

e-SBI was found to be effective in most settings where it was studied (e.g., healthcare settings and universities) and across various population groups. Sixteen studies (20 study arms) demonstrated favorable effects among university students, as did studies involving older populations (median age 40 years). However, only one study included a sample of adolescents.[67] Moreover, the intervention reduced excessive alcohol consumption among men and women, although the magnitude of the sex-specific effects varied across studies.[39,42,46,51,58,60,61] Data on the effectiveness of e-SBI by race/ethnicity and income were also limited.

Potential Harms and Other Benefits

Although e-SBI interventions pose minimal risk of harm, steps should be taken to ensure quality control and the safeguarding of personal information. Poorly designed e-SBI applications may not incorporate validated screening measures or may provide inappropriate feedback to users, resulting in misdiagnosis of alcohol problems and delivery of ineffective advice. It is also important to assure that personal information is protected, including when e-SBI is implemented in community settings, which may not have the privacy protections required in healthcare facilities.

No additional intervention benefits were found.

Evidence Gaps

The studies reviewed demonstrated an association between e-SBI and reduced alcohol consumption and related harms; however, further research should assess e-SBI effectiveness in other settings (e.g., military, worksites, public health organizations) and among specific populations (e.g., adolescents, racial and ethnic minority groups). Additional studies comparing e-SBI with traditional ASBI should be conducted to assess relative benefits. More research is also needed to determine the optimal intervention intensity, the relative effectiveness of different types of feedback on drinking behavior, the long-term effectiveness (beyond 12 months), and the potential usefulness of "booster sessions" to improve the long-term effect of e-SBI on drinking behavior. Future research should also evaluate the cost-effectiveness of e-SBI in communities where e-SBI has been widely implemented.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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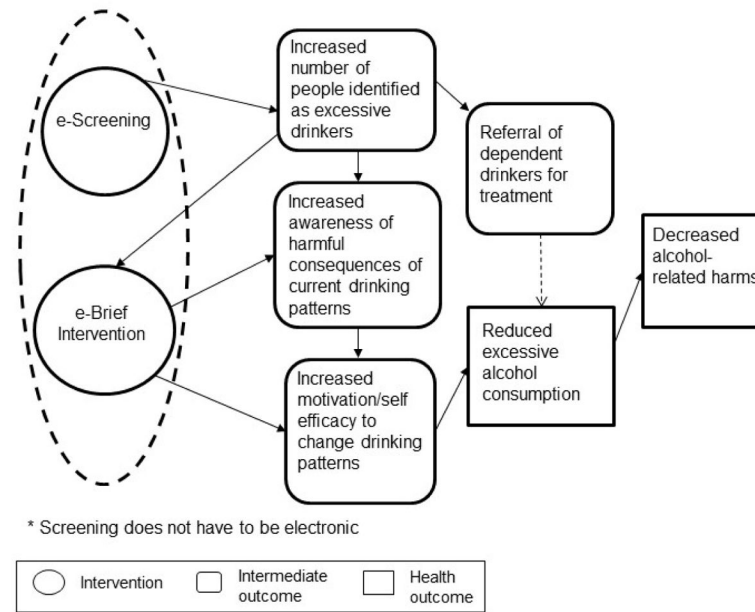**Figure 1.**
Model showing conceptualization of how alcohol e-SBI is expected to reduce excessive alcohol consumption and related harms.
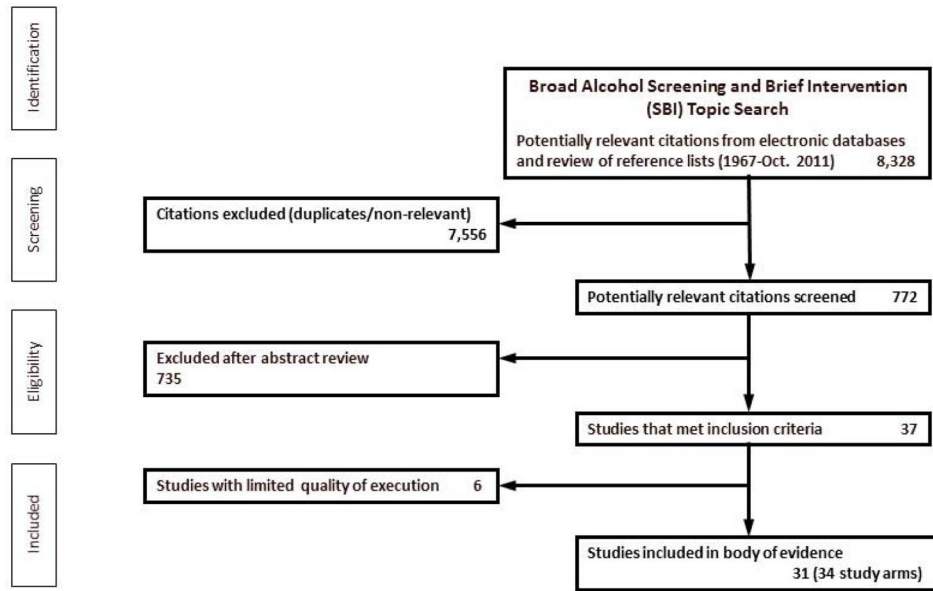
Figure 2.
Alcohol e-SBI systematic review search yield (1967 – October 2011).

Table 1

Summary of Outcomes Related to Frequency and Quantity of Alcohol Consumption

Outcome measure	All drinkers[a]			Excessive drinkers[b]		
	Median baseline	Study arms	Median relative change % (IQI)	Median baseline	Study arms	Median relative change % (IQI)
Binge drinking						
Binge drinking frequency episodes/month	3	2	−1.8	6.1	9	−16.5 (−35.6, −11.8)
• Peak consumption (overall)	N/A	5	−19.1 (−42.1, 17.7)	N/A	9	−23.9 (−51.3, −2.1)
• Peak consumption (max drinks/binge episode)	4.2	2	−33.9	9.2	5	−13.1 (−38.8, −1.8)
Peak consumption (estimated BAC)	0.10 g/dL	3	−18.1	0.18 g/dL	4	−32.2
Monthly alcohol consumption						
Frequency of alcohol consumption/month	4.6	1	−14.4	8.2	8	−11.5 (−17.3, −4.9)
Mean no. drinks/month	29.3	7	−16.2 (−33.4, −8.2)	55.6	16	−13.8 (−31.7, −10.8)
Drinks per drinking day						
Average no. drinks/drinking day	5.1	2	−13.5	7.6	14	−5.5 (−14.5, 1.1)

[a] Results for all drinkers, including those above and below threshold for excessive drinking.

[b] Results for people who screened positive for excessive drinking (as defined by study authors).

BAC, blood alcohol concentration; dL, deciliter; g, grams; IQI, interquartile interval; N/A, not applicable

Table 2

Average Number of Drinks per Drinking Day, Stratified by Potential Effect Modifiers

Descriptive variables			No. of study arms[a]	Median baseline	Median relative percent change in consumption (IQI)
Recruitment population	Universal/probability sample		7[39,52–54,58,62]	8.0	−8.4 (−16.8, −5.0)
	Convenience		7[37,38,41,42,48,49,63]	6.0	−0.8 (−16.0, 1.3)
Setting	Healthcare		5[39,53,54,62]	8.0	−13.0 (−23.9, −1.5)
	University		8[37,38,41,42,48,52,58,63]	6.7	−7.2 (−14.5, 0.6)
	Community-based		1[49]	8.8	1.3
Delivery mode of screening	Fully automated		9[38,49,52–54,58,62,63]	8.0	−6.0 (−11.5, 0.3)
	Other[b]		5[37,39,41,42,48]	5.7	−16.0 (−16.9, 5.8)
Delivery mode of brief intervention	Fully automated		12[37,42,48,49,52–54,58,62,63]	7.4	−6.0 (−14.5, 1.1)
	Partially automated/interpersonal[c]		1[39]	3.4	−16.8
Type of feedback[d]	Motivational	None[e]	6[48,52–54,63]	8.0	−6.0 (−16.0, −0.8)
		Low-level[f]	1[42]	6.0	10.6
		High-level[g]	5[37,39,49,58,62]	7.4	−8.4 (−23.9, −1.1)
	Normative[h]		10[37,42,48,49,52–54,58]	7.8	−4.2 (−9.5, 1.5)
	No normative feedback		3[39,62,63]	5.2	−16.8 (−31.0, −0.8)

[a] Includes only those studies for which a relative change could be calculated.

[b] Written on paper or not reported.

[c] Web-based and phone.

[d] At minimum, all types of feedback are personalized feedback.

[e] No motivational feedback—personalized risks and consequences.

[f] Low-level motivational feedback (e.g., general advice).

[g] High-level motivational feedback (e.g., commitment to change, goal setting).

[h] Normative feedback—national or local comparison to others of similar age or gender; may also incorporate motivational feedback (not mutually exclusive).

IQI, interquartile interval