

# Preventive Care in the Emergency Department: Screening and Brief Intervention for Alcohol Problems in the Emergency Department: A Systematic Review

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## Abstract

**Objective:** To systematically review the medical literature in order to determine the strength of the recommendation for screening and brief intervention (SBI) for alcohol-related problems in the emergency department (ED) setting. **Methods:** The review followed the methodology of systematic reviews and was facilitated through the use of a structured template, a companion explanatory piece, and a grading and methodological scoring system based on published criteria for critical appraisal. The primary outcome measure was the prevention of mortality and morbidity secondary to alcohol-related illnesses/injuries. The secondary outcome measures included: decreased consumption; fewer ED/outpatient visits and hospitalizations; a decrease in social consequences; and increased referrals for follow-up and/or treatment. Three Medline searches as well as a search of the Cochrane Library were performed. Two team members reviewed the abstracts and selected pertinent

articles. References were screened for additional pertinent articles. **Results:** Twenty-seven articles were identified and reviewed, in addition to the 14 primary articles included in the 1996 U.S. Preventive Services Task Force Report. The study populations were diverse, including inpatient, outpatient, and college settings, with ages ranging from 12 to 70 years. Four studies were ED-based and two included EDs as one of multiple sites. Thirty-nine studies on SBI, 30 randomized controlled and nine cohort, were used to formulate the current recommendation. A positive effect of the intervention was demonstrated in 32 of these studies. **Conclusions:** The authors recommend that SBI for alcohol-related problems in the ED be incorporated into clinical practice. **Key words:** alcohol; public health; screening; emergency department; interventions. *ACADEMIC EMERGENCY MEDICINE* 2002; 9:627–638.

Alcohol is the most commonly used drug in the United States, and a leading cause of morbidity and mortality.<sup>1</sup> Its use and abuse are a major public health problem, contributing to more than 100,000 deaths each year and costing U.S. society more than \$185 billion annually.<sup>2</sup> The emergency department (ED) visit offers a unique opportunity to screen patients for alcohol problems and offer brief intervention.<sup>3,4</sup>

There are more than 100 million ED visits per year, with a substantial portion of these related to alcohol.<sup>5</sup> Studies report that 24–31% of ED patients screen  $\geq 2$  CAGE questions positively.<sup>6,7</sup> Alcohol is a major risk factor for virtually all categories of injury.<sup>8,9</sup> It has been demonstrated that alcohol is a factor in 60–70% of homicides, 40% of suicides, 40–50% of fatal motor vehicle crashes, 60% of fatal burn injuries, 60% of drownings, and 40% of fatal

falls.<sup>10–14</sup> Nearly 50% of severely injured trauma patients<sup>15,16</sup> and 22% of minor trauma patients<sup>17</sup> are injured while under the influence of alcohol. Alcohol is also a risk factor in a variety of diseases, including hypertension, stroke, diabetes, liver, and other gastrointestinal diseases as well as breast and esophageal cancer.<sup>18</sup>

Emergency physicians do not routinely offer screening and brief intervention (SBI) as part of their current clinical practice,<sup>19</sup> nor is SBI consistently included as part of the emergency medicine curriculum.<sup>20</sup> Recent data have demonstrated that using structured screening questionnaires is necessary, and relying on clinical suspicion to detect acute alcohol intoxication or chronic alcohol problems is inaccurate.<sup>21</sup>

The U.S. Preventive Services Task Force (USPSTF) assigned a “B” recommendation for screening adolescents and adults for problem drinking in 1996 based on the available level of evidence classified as “I, II-2.” Pregnant women also received a “B” recommendation with the level of evidence cited as II-2<sup>22</sup> (Table 1). This included screening all adult, adolescent, and pregnant patients for problem and hazardous drinking patterns. They stated that screening should involve a careful history of alcohol use and/or the use of standardized screening questionnaires. They were careful to add that all who screened positively by questionnaires should

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Received June 6, 2001; revision received December 3, 2001; accepted December 19, 2001.

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TABLE 1. U.S. Preventive Services Task Force Guidelines

Strength of Recommendations	Quality of Evidence
A: There is good evidence to support the recommendation that the condition be specifically considered in a periodic health examination.	I: Evidence obtained from at least one properly randomized controlled trial.
B: There is fair evidence to support the recommendation that the condition be specifically considered in a periodic health examination.	II-1: Evidence obtained from well-designed controlled trials without randomization.
C: There is insufficient evidence to recommend for or against the inclusion of the condition in a periodic health examination, but recommendations may be made on other grounds.	II-2: Evidence obtained from well-designed cohort or case-control analytic studies, preferably from more than one center or research group.
D: There is fair evidence to support the recommendation that the condition be excluded from consideration in a periodic health examination.	II-3: Evidence obtained from multiple time series with or without the intervention. Dramatic results in uncontrolled experiments (such as the results of the introduction of penicillin treatment in the 1940s) could also be regarded as this type of evidence.
E: There is good evidence to support the recommendation that the condition be excluded from consideration in a periodic health examination.	III: Opinions of respected authorities, based on clinical experience; descriptive studies and case reports; or reports of expert committees.

From the U.S. Preventive Services Task Force.

have further assessments. Routine use of biochemical markers such as serum gamma-glutamyl transferase (GGT) was not recommended. Pregnant patients who drank more than two drinks per day were considered "at risk." "Although there is insufficient evidence to prove or disprove harm from occasional, light drinking during pregnancy, abstinence from alcohol can be recommended on other grounds: possible risk from even low-level exposure to alcohol, lack of harm from abstaining, and prevailing expert opinion."<sup>22</sup>

In terms of interventions, the USPSTF stated that patients with evidence of alcohol dependence should be referred, where possible, to appropriate clinical specialists or community programs specializing in the treatment of alcohol dependence. Patients with evidence of alcohol abuse or hazardous drinking should be offered brief advice and counseling.

The USPSTF based their recommendation on the quality of the 14 important primary studies that included screening and intervention (Table 2).<sup>23-36</sup> Nine of these were randomized controlled studies and five were cohort studies. The majority of grading points were lost because of the investigators' inability to eliminate bias through double blinding. There were 25 other important secondary studies cited in the USPSTF report. All studies were published before 1995. Both the primary and secondary studies were conducted largely in general outpatient/primary care settings.<sup>23,25-31</sup> Most included adult patients more than 18 years of age, although two included adolescents starting at ages 12<sup>28</sup> and 15.<sup>30</sup> Five studied pregnant women.<sup>32-36</sup> One primary study was conducted exclusively in an inpatient setting,<sup>24</sup> and one other included inpatients as

one of its many sites.<sup>31</sup> Only two included ED patients as part of multiple sites.<sup>30,31</sup> Screening and brief intervention was repeatedly shown to be effective in decreasing alcohol consumption. Specific studies documented a decrease in morbidity, including an improvement in liver function tests,<sup>23,28,29</sup> a reduction in blood pressure,<sup>27,29</sup> and improved fetal health.<sup>36</sup>

This current systematic review of SBI for alcohol problems is one topic included as part of an evidence-based project to evaluate evidence for success of prevention and screening interventions that might be offered in EDs.<sup>37,38</sup> It includes screening and intervention studies that were not mentioned in the USPSTF report as well as other articles that have been published since 1996 in an effort to determine the strength of the recommendation for SBI for alcohol problems in the ED.

## METHODS

This review followed the methodology of systematic review<sup>39-41</sup> and was facilitated through the use of a structured template, a companion explanatory piece, and a grading and methodological scoring system based on published criteria for critical appraisal (Table 3). The full protocol and its underlying assumptions have been described elsewhere.<sup>38</sup> Each candidate preventive intervention was reviewed by a two-person review team who followed a template that provided a uniform approach to search strategy, selection criteria, methodology appraisal, and analysis of the results of primary studies bearing on ED cost-effectiveness. A grading scheme was developed that took into account the evidence and recommendations of the USPSTF<sup>22</sup>

supporting primary efficacy of the intervention and the level of evidence supporting ED application identified by the PHTF review teams. The grades were described as alpha, beta, gamma, and omega. The grading scheme is shown in Table 4.

The primary outcome measure was defined as 1) the prevention of mortality and morbidity secondary to alcohol-related illnesses/injuries. The secondary outcome measures included: 2) decreased alcohol consumption; 3) fewer ED/outpatient visits and hospitalizations; 4) decrease in social consequences; and 5) increased referrals for follow-up and/or treatment. We planned to review all articles that pertained to SBI for alcohol problems in EDs. As few studies specifically relate to ED interventions, it was necessary to expand the review to include recent data covering general populations, primary care, and inpatient interventions. Populations chosen to be included were: high school/college students; adult primary care; ED adults and adolescents; and hospitalized adult patients.

Multiple search strategies were constructed. The search terms used for Medline included:

1. Emergency service, hospital/ or "emergency department".mp.substance-related disorders/ or "substance abuse".mp. Intervention studies/ or "intervention".mp "BRIEF INTERVENTION".mp "SCREENING".mp (Combined as "and").
2. Alcohols/ or "alcohol".mp. "Early intervention (education)"/ or "intervention".mp. Emergency service, hospital/ or Substance-related disorders/ or "emergency service".mp (Combined as "and").
3. Emergency service, hospital/ or "emergency department".mp. Substance-related disorders/ or "substance abuse".mp. Intervention studies/ or "intervention".mp. "BRIEF INTERVENTION".mp. "SCREENING".mp (Combined as "and").

The Cochrane Library was searched for the following terms: alcohol screening, alcohol interventions, and alcohol and emergency department.

Studies that were subsets or continuations of original data published earlier were excluded from the review.

## RESULTS

The Medline search strategies revealed 161, 59, and 81 documents, respectively; the searches were not mutually exclusive. The Cochrane Library search revealed no relevant trials. The authors agreed that 33 articles met inclusion criteria and should be reviewed. Of these, eight articles<sup>23-26,28-31</sup> were already

reviewed as part of the USPSTF primary studies. The bibliographies of articles selected for inclusion were reviewed, and four additional articles were discovered for inclusion, including two<sup>35,36</sup> that were already included in the original USPSTF review. Therefore, a total of 27 articles were reviewed.

General characteristics, outcomes, effect, and grading scores for each of the 27 studies are summarized in Table 5.<sup>42-68</sup> The studies are ordered according to their grading scores from highest to lowest; randomized controlled trials (RCTs) precede cohort studies. The study populations were diverse, reflecting three distinct populations: inpatients, outpatients, and college students. Ages ranged from 12 to 70 years, and several studies were gender-specific.

Overall, 21 are characterized as RCTs, and six as cohort studies. The studies differed in their inclusion/exclusion criteria, follow-up rates, and outcome measures. Specifically, some included patients with alcohol dependence, while others targeted patients with less-severe alcohol problems. The length and intensity of the interventions also varied. Most commonly the interventions were described as short, motivational sessions that included feedback, education in the harm and consequences of heavy drinking, and advice to lower drinking consumption to low-risk levels. However, the initial session ranged from 5 to 60 minutes, and entailed one lone session or as many as six follow-up sessions.

The grading system reflects the methodologic design of the study and adequacy of the follow-up. The lower scores are primarily the result of inadequate blinding and low follow-up rates. While often it is not possible to double-blind alcohol intervention studies, blinded assessments are possible. Only two studies attempted to blind the patients to the intervention by embedding the alcohol questions in other health assessments.<sup>42,43</sup> Approximately one-third of the studies stated that the follow-up assessments were blinded. The majority of the studies did not specify their randomization schemes, resulting in the loss of a grading point. Poor retention of study patients resulting in follow-up rates below 80% also resulted in the loss of one point.

Four specifically used the ED as their setting.<sup>55,58,65,68</sup> More than 40 years ago, Chafetz and colleagues<sup>58</sup> demonstrated the first brief intervention in the ED. They reported that less than 1% of the 1,200 patients diagnosed as alcohol-dependent in the ED at Massachusetts General Hospital sought treatment at the hospital's outpatient alcohol clinic. Chafetz et al. developed a program to initiate contact with these patients in the ED and

TABLE 2. U.S. Preventive Services Task Force Primary Studies

First Author	Year	Population/ Age (Yr)	Setting	Intervention	Follow-up Rate	Study Design	Outcome	Conclusion	Grade
Wallace P <sup>23</sup>	1988	Adults <i>n</i> = 909	Primary care, 47 practices	Brief motivational interview (BI): 1 (unknown time) Advice & drinking diary Follow-up (F/u) 1–4 sessions	6 mo & 12 mo 87% & 85% (excluded 26 pts who moved)	Randomized controlled trial (RCT)	↓ Alcohol consumption ↓ GGT levels*	(+) Effect	5/5
Chick J <sup>24</sup>	1985	18–65; men <i>n</i> = 156	Inpatients	BI: 1 (60 minutes) F/u: none	12 mo 83%	RCT	↓ Alcohol consumption ↓ Alcohol-related problems	(+) Effect	3/5
Romelsjo A <sup>25</sup>	1989	18–64 <i>n</i> = 83	Primary care	BI: (unknown time) Advice given F/u: mean 3 sessions	12 mo 87%	RCT	– Alcohol consumption – GGT levels	No effect	3/5
Heather N <sup>26</sup>	1990	18–70 <i>n</i> = 107	General population	BI: (unknown time), 4 groups: Control; self- help manual; + phone service or interview	6 mo 81%	RCT	↓ Alcohol consumption	(+) Effect	3/5
Cox KL <sup>27</sup>	1993	20–45; men <i>n</i> = 75	General population	Low-alcohol beer or regular consumption + light or vigorous exercise	4 weeks 96%	RCT	↓ Alcohol consumption ↓ Blood pressure	(+) Effect	3/5
Nilssen O <sup>28</sup>	1991	12–62 <i>n</i> = 338	General population, Tromso, Norway	BI: (unknown time) Control group or (1) Advice on ↑ GGT* and F/u letter or (2) Advice specifically to ↓ alcohol intake F/u: 1–3 sessions	12 mo 95%	RCT	↓ Alcohol consumption ↓ GGT levels	(+) Effect	2/5
Maheswaran <sup>29</sup>	1992	Adult men <i>n</i> = 47	Hypertension outpatient clinic	BI: 1 (10–15 minutes) F/u: 4 (every 2 weeks)	8 weeks 87%	RCT	↓ Alcohol consumption ↓ GGT levels ↓ Blood pressure	(+) Effect	2/5
†Persson J <sup>30</sup>	1989	15–70 <i>n</i> = 78	ED/clinics, 5 practices	BI: (unknown time) F/u: 1 month by nurse; 3 months by physician	12 mo 69%	RCT	↓ Alcohol consumption ↓ GGT, triglycerides ↓ Sick days	(+) Effect	1/5
†Babor TF <sup>31</sup>	1992	Adults <i>n</i> = 1,119	Inpatient/EDs/ primary care clinics/college	BI: advice (5 minutes) + booklet or coun- seling (15 minutes)	9 mo 75%	RCT	↓ Alcohol consumption	(+) Effect	1/5
Streissguth AP <sup>32</sup>	1990	Pregnant women <i>n</i> = 500 482 children	Prenatal clinic	No intervention Observational study	1, 2 days 8, 18 mo 4, 7 yr	Cohort	↓ Child IQ ↑ Learning problems	No intervention	3/3

Author	Year	Population	Setting	Intervention	Comparison	Follow-up	Outcomes	Quality
Jacobson JL <sup>33</sup>	1993	African American, inner-city infants n = 382	Mothers who drank recruited at prenatal clinic	No intervention	No intervention	6, 12, & 13 mo	Cohort	↓ Infant development No intervention 3/3
Larson G <sup>34</sup>	1983	Pregnant women n = 464	4 prenatal clinics	Counseling and F/u sessions—unspecified	100% up until 1 week after delivery	100% up until 1 week after delivery	Cohort	↓ Alcohol consumption – Fetal development (+) Effect 2/3
Rosett HL <sup>35</sup>	1983	Pregnant women n = 49	1 prenatal clinic	I: (unknown time) F/u sessions 1–4/month	100% up until birth	100% up until birth	Cohort	↓ Alcohol consumption (+) Effect 2/3
Halmesmaki E <sup>36</sup>	1988	Pregnant women n = 85 Infants n = 72	Outpatient clinic	I: (unknown time) F/u: 2–4-week intervals	Infants: 5 days 4, 6 (100%), & 12 mo (65%)	Infants: 5 days 4, 6 (100%), & 12 mo (65%)	Cohort	↓ Alcohol consumption ↓ Fetal alcohol syndrome (+) Effect 2/3

\*GGT = gamma-glutamyltransferase.  
†Emergency department (ED) included as study site.

created a user-friendly referral system with dramatic results. Sixty-five percent of patients randomized to the treatment group made a follow-up visit to the alcohol clinic, compared with 5% of the control group, and half returned to the clinic for five or more visits.

More recently, Monti et al.<sup>55</sup> evaluated the use of a 30-minute, brief motivational interview (BI) compared with standard care (SC) in reducing alcohol-related consequences and use among 18- and 19-year-old adolescents presenting to an urban ED after an alcohol-related event. Follow-up at six months revealed a significantly lower incidence of alcohol-related injuries ( $p < 0.01$ ), drinking and driving, and social consequences such as traffic violations and alcohol-related problems (e.g., with dates, friends, police, school, or parents) ( $p < 0.05$ ) than in the SC group. Both groups significantly reduced their drinking during the follow-up period.

It is possible that the lengthy assessment in the SC group was in fact more than standard care and acted in itself as an intervention. However, it is also possible that the experience of having an alcohol-related ED visit may account for this reduction, and therefore makes the ED encounter a “teachable moment.” Longabaugh et al. reported that injury itself is a powerful motivator to reduce drinking and concluded that interventions to decrease drinking in injured patients should focus on increasing the patient’s awareness of the association between drinking, injuries, and other alcohol-related negative consequences.<sup>69</sup>

Bernstein and colleagues<sup>65</sup> trained community outreach workers as part of Project ASSERT to screen adult ED patients for alcohol problems using a health needs history. Those patients who screened positively were then administered a brief negotiated interview (15–20 minutes) based on readiness-to-change principles. Patients enrolled in the follow-up program were primarily alcohol- and/or other-drug-dependent. Although this group was small, 50% reported contact with a specialized treatment center and there was a 56% reported reduction in alcohol use.

Wright et al.<sup>68</sup> reported the effect of having alcohol health workers counsel patients identified with alcohol problems in an ED in London, England. Forty-six (65%) reported drinking less alcohol at six months, as opposed to six (8.5%) who reported drinking more. The overall reduction was statistically significant ( $p < 0.001$ ). This study, along with that reported by Bernstein et al.<sup>65</sup> and Chafetz et al.<sup>58</sup> demonstrates that a brief intervention in the ED may involve linkage to a substance abuse treatment center.

Two studies included in the USPSTF review in-

TABLE 3. Scoring System

Type of Study	Question	Score	
Randomized controlled trials	Was the study described as randomized?	1 for "yes" 0 for "no"	
	Was the study described as double blind?	1 for "yes" 0 for "no"	
	Was there a description of withdrawals and dropouts?	1 for "yes" 0 for "no"	
	a) Was the method to generate the sequence of randomization described and was it appropriate (random numbers, computer generated, etc.)?	1 for "yes" 0 for "no"	
	b) Was it inappropriate (alternate allocation, by date of birth, chart number, etc.)?	-1 for "yes" 0 for "no"	
	a) Was the method of double blinding described and appropriate (identical placebo, etc.)?	1 for "yes" 0 for "no"	
	b) Was it inappropriate (comparison of tablet to injection without double dummy, etc.)?	-1 for "yes" 0 for "no"	
	Was the loss to follow-up rate greater than 20%?	-1 for "yes" 0 for "no"	
	Cohort studies	Was there a representative and well-defined sample of patients at a similar point in the course of the disease? (Were all subjects in the study appropriate targets of intervention?)	1 for "yes" 0 for "no"
		Was follow-up sufficiently long and complete? (Was there adequate follow-up time for the outcome measures to be properly assessed?)	1 for "yes" 0 for "no"
Was there adjustment for important prognostic factors? (Were factors other than the intervention controlled for?)		1 for "yes" 0 for "no"	

TABLE 4. Strength of Recommendations

<i>Alpha:</i> The U.S. Preventive Services Task Force (USPSTF) recommends this prevention, screening, or counseling intervention (A or B). Evidence is sufficient to support offering this in the emergency department (ED) setting, assuming sufficient resources are available.
<i>Beta:</i> USPSTF recommends this prevention, screening, or counseling intervention (A or B). Existing research is not sufficient to recommend for or against offering this preventive service routinely in the ED. Research into this area is strongly encouraged.
<i>Gamma:</i> USPSTF found insufficient evidence to make a recommendation on this prevention, screening, or counseling intervention (C). Evidence to recommend for or against offering this preventive service routinely in the ED is also insufficient. Research on the efficacy on interventions in this area is needed.
<i>Omega:</i> Regardless of the level of the USPSTF recommendation, this is not recommended for ED implementation.

From the U.S. Preventive Services Task Force.

cluded the ED as a site of enrollment for patients along with primary care settings.<sup>30,31</sup> Both studies were RCTs and reported a significant decrease in alcohol consumption with BI. Persson and Magnusson<sup>30</sup> enrolled patients with "excessive drinking patterns" or elevated GGT levels from five different outpatient clinics including "emergency rooms, orthopedic, medical and surgical departments, and a district health center." The authors did not report the length or content of the intervention, but patients were seen by a nurse each month and a physician every third month. At 12 months a 69% follow-up rate was obtained. The World Health

Organization study reported by Babor and Grant<sup>31</sup> enrolled patients in eight countries with different cultural orientations and social circumstances. A 75% follow-up rate was reported at nine months. The most significant finding in this study was that 5 minutes of simple advice was shown to be as effective as brief counseling (20 minutes) and extended counseling (up to three follow-up sessions). Unfortunately, neither study reported the number of patients enrolled from EDs or performed any analyses specific to this population.

Overall, combining the results of this review with the original primary studies using the 1996 USPSTF report results in 39 studies, including 30 RCTs and nine cohort studies. A total of 32 studies demonstrate a positive effect in one or more of the outcome variables. The primary outcome of decreasing morbidity and mortality was demonstrated in 12 studies (38%), as measured by a decrease in GGT, blood pressure, fetal alcohol syndrome, and injuries. A positive effect for the secondary outcome measures was reported in the following studies: a decrease in alcohol consumption (29/32, 90%); fewer ED/outpatient visits and hospitalizations (4/32, 13%); a decrease in social consequence (4/32, 13%); and an increase in referrals (4/32, 13%).

## DISCUSSION

Brief interventions have been shown to be effective in a variety of settings. As noted above, interventions may vary in their intensity, in regard to both

the length of time of the initial intervention and the number and type of follow-up sessions. Bien and colleagues reviewed 32 controlled studies of BI targeting drinking behavior in treatment settings across 14 nations, and found that BI is more effective than no counseling, and often as effective as more extensive, expensive, and lengthy treatment.<sup>70</sup> More recently Wilk et al. pooled outcome data from 12 RCTs addressing BI in heavy drinkers and found combined odds ratio of close to 2 (1.91; 95% CI = 1.61 to 2.27) in favor of BI over no intervention. This finding was consistent across gender, intensity of intervention, type of clinical setting, and higher-quality clinical trials.<sup>71</sup>

While primary care and inpatient settings may allow for more extensive intervention, the ED setting necessitates brevity. It is encouraging that even 5-minute interventions were effective.<sup>31</sup> It is also possible that the outcomes of brief intervention will vary depending on the severity of the problem. Brief interventions have been shown most effective with at-risk, or harmful/hazardous drinkers to reduce consumption and harmful events. The role of BI in the ED for dependent drinkers may be limited to negotiating patient acceptance for a referral to a specialized treatment program and compliance toward medical regimens for comorbid conditions.

Only four articles specifically enrolled patients in the ED, and two included the ED as one of the enrolling sites. Of the four studies with all ED patients, two were classified as RCTs and rated as follows: Chafetz<sup>58</sup> (1/5) and Monti<sup>55</sup> (2/5). Two were cohort studies with the following ratings: Bernstein<sup>65</sup> (2/3) and Wright<sup>68</sup> (1/3). The two studies that included the ED site as part of the study were both RCTs and rated similarly (1/5). The majority of points for the RCTs were lost for lack of double blinding, not describing the method of generating the sequence of randomization, and a <80% follow-up rate.

In addition to the studies mentioned above which enrolled patients from ED settings, another important study of particular significance to emergency medicine is that reported by Gentilello et al.<sup>43</sup> Although the ED was not the site of enrollment, all patients were initially seen in the ED. Admitted trauma patients who screened and/or tested positively for a continuum of alcohol problems were randomized to either a control group or a single 30-minute motivational intervention performed by a psychologist. At 12-month follow-up, the BI group significantly reduced their alcohol consumption ( $p < 0.03$ ) This was most apparent in the patients who were mild-moderate drinkers ( $p < 0.01$ ), similar to numerous other studies. Most importantly though, the intervention group had a 47% reduction in in-

juries requiring ED or hospital admission at one-year follow-up and a 48% reduction in injuries requiring hospital admission at three-year follow-up. These results suggest that injured patients discharged from the ED may benefit from BI.

In addition, Monti's<sup>55</sup> work with injured, and Marlatt's<sup>47</sup> work with non-injured adolescents demonstrate that while BIs may be effective in decreasing alcohol consumption in this age group, they are most effective in decreasing alcohol-related problems. This includes drinking and driving, moving violations, alcohol-related injuries, and alcohol-related problems that drinking may cause with dates, friends, police, and parents, and at school. Future strategies for intervening with adolescents in the ED need to consider these factors.

Brief interventions were performed by a variety of professions/staff members in the studies mentioned. While traditional care providers such as physicians, nurses, and other health care professionals such as social workers and psychologists have been shown to be effective in administering brief interventions, other nonprofessionals such as community outreach workers or "health promotion advocates" in the Bernstein study<sup>65</sup> have been successfully trained to screen and intervene with patients with alcohol problems. In busy EDs, with limited staffing and competing priorities, it may be beneficial to investigate creative ways to provide SBI, such as with community workers who are less expensive than physicians, nurses, and social workers.

In addition to being effective, SBI has been shown to be cost-effective. Recently Fleming et al.<sup>72</sup> reported a cost analysis of data from their RCT of BI in a primary care setting, Project TrEAT.<sup>42</sup> They compared the cost of the intervention with changes in health care utilization, legal events, and motor vehicle crashes over a 12-month follow-up period. They reported that the average per-subject benefit of the intervention was \$1,151, with the cost per subject of \$205, resulting in a benefit-cost ratio of 5.6:1. They concluded that this is the first quantitative evidence the BI can benefit not only the patient, but also society and the health care system.

## LIMITATIONS

Brief interventions have been shown to be efficacious in decreasing alcohol consumption and harm reduction in a variety of settings. However, the number of studies conducted specifically in EDs is limited, and further studies demonstrating the effectiveness of BI in the ED setting is warranted. The existing evidence, in addition to the high prevalence of alcohol-related problems in the ED setting,

TABLE 5. Results of the Systematic Review

First Author	Year	Study Design	Population/ Age	Setting	Intervention	Follow-up Rate	Outcome*	Conclusion	Grade
Fleming MF <sup>42</sup>	1997	Randomized controlled trial (RCT)	Adults <i>n</i> = 774	Primary care	Brief motivational interview (BI): 2 (15 min) (2) Follow-up (f/u) phone calls	6 mo & 12 mo 93%	2: + reduction 3: + reduction in men	(+) Effect	5/5
†Gentilello LM <sup>43</sup>	1999	RCT	≥18 yr; trauma admissions <i>n</i> = 762	Inpatient trauma center	BI: 1 (30 min) F/u letter in 1 month	6 mo & 12 mo 75% & 54%	1: + reduction 2: + reduction 3: + reduction	(+) Effect	4/5
Scott E <sup>44</sup>	1991	RCT	17–69 yr; women <i>n</i> = 72	Primary care 8 practices	BI: 1 (10 min) no f/u sessions	12 mo 69%	2: – reduction; both groups ↓ed	No effect	3/5
Richmond R <sup>45</sup>	1995	RCT	18–70 yr <i>n</i> = 378	Primary care 40 practices	BI: 1 (15 min) 1–4 f/u sessions	6 mo & 12 mo 73% & 69%	2: – reduction 4: + reduction in alcohol-related problems at 6 mo	(±) Effect	3/5
Ockene JK <sup>46</sup>	1997	RCT	21–70 yr <i>n</i> = 530	Primary care medical sites	BI: 1 (5–10 min)	6 mo	2: + reduction	(+) Effect	3/5
Marlatt GA <sup>47</sup>	1998	RCT	High school seniors ≤19 yr <i>n</i> = 348	Freshman year of college	BI: 1 (60 min) (1) f/u by mail at 1 yr; high-risk students had additional phone-in/in-person sessions	12 mo & 24 mo 84%	2: + reduction 4: + reduction	(+) Effect	3/5
Chang G <sup>48</sup>	1999	RCT	Pregnant women <i>n</i> = 250	Prenatal clinic	BI: (45 min) after 2-hr assessment or 2-hr assessment only	Mean of 57 days after delivery 99%	2: + reduction in both groups	(±) Effect	3/5
Bosari B <sup>49</sup>	2000	RCT	Mean age 18.5 yr <i>n</i> = 60	College students	BI: 1 (60 min)	6 wk 98%	2: + reduction	(+) Effect	3/5
Kristenson H <sup>50</sup>	1983	RCT	46–49 yr; men <i>n</i> = 473	General population, Malmö, Sweden	BI: 1 (unknown time) multiple session (up to every 3 months)	24 mo–60 mo 79%	1: + reduction 3: + reduction	(+) Effect	2/5
Heather N <sup>51</sup>	1987	RCT	18–65 yr <i>n</i> = 104	Primary care 16 practitioners	BI: Full (DRAMS) multiple f/u sessions (unknown time) or Advice only; no f/u	6 mo 88%	1: + reduction in GGT 2: – (all groups had ↓)	No effect	2/5
Anderson P <sup>52</sup>	1992	RCT	17–69 yr; men <i>n</i> = 154	Primary care 8 practices	BI: 1 (10 min) No f/u sessions	12 mo 65%	1: – reduction 2: + reduction 4: – reduction	(+) Effect	2/5
McIntosh MC <sup>53</sup>	1997	RT (no control group)	Adults <i>n</i> = 159	Primary care 12 practices, Sydney, Australia	BI: 1 (5 min) of advice or 2 (30 min) sessions Physician or nurse	3 mo, 6 mo, 12 mo 99%, 93%, 90%	2: + reduction all 3 interventions	(+) Effect	2/5



Senft R <sup>54</sup>	1997	RCT	≥21 yr n = 516	3 large primary care facilities	Bl: 1 (45 min) No f/u sessions	6 mo & 12 mo 84% & 80%	2: ± modest reduction 3: - change	No effect	2/5
\$Monti PM <sup>55</sup>	1999	RCT	18-19 yr; after an alcohol-related event n = 94	Emergency department (ED)	Bl: 1 (35-40 min) No f/u sessions	3 mo & 6 mo 93% & 89%	1: + reduction 2: + reduction in both groups; - Δ between groups	(+) Effect	2/5
Adito M <sup>56</sup>	2000	RCT	20-60 yr; women n = 118	4 primary care & 1 occupational health clinic	Bl: 7 vs 3 sessions (10-20 min) + self-help manual	36 mo	1: + reduction in MCV 2: - reduction	No effect	2/5
Forsberg L <sup>57</sup>	2000	RT (no control)	16-73 yr n = 186	Inpatient surgical ward	Bl: 1 (26 min) Extended counseling (1-2.5 hours)	6 mo & 12 mo 74% & 72%	2: + reduction in amount per occasion in both groups	(+) Effect	2/5
\$Chafetz ME <sup>58</sup>	1962	RCT	Adult males n = 200	Emergency ward	Bl: 1 (unknown time) Establish relationship and refer	12 mo 89%	5: + referral	(+) Effect	1/5
Seppa K <sup>59</sup>	1992	RCT	Adults with high MCV† n = 178	Primary care	Bl: (unknown time) F/u every 3 months	12 mo 53%	1: - Δ in MCV† 2: - reduction	No effect	1/5
Antti-Polka J <sup>60</sup>	1988	RCT	20-64 yr; male, injured patients n = 120	Admitted to hospital	Bl: 1 (unknown time) F/u sessions 1-3 during clinic visit	6 mo 74%	1: - GGT levels 2: + reduction	(+) Effect	1/5
Tomson Y <sup>61</sup>	1998	RCT	25-54 yr; n = 222	General public, Varby Health Center catchment area, Sweden	Bl: 1 (unknown time) 1-3 f/u sessions All with nurse	24 mo 45%	1: + reduction in GGT levels 2: + reduction	(+) Effect	1/5
Cordoba R <sup>62</sup>	1998	RCT	14-50 yr; male n = 546	74 primary care practices in Spain	Bl: (15 min) vs Advice (5 min) F/u: none scheduled Mean 1.5	12 mo 42%	2: + reduction BI vs advice	(+) Effect	1/5
Wette JW <sup>63</sup>	1998	Cohort	Adults, mean age of 40 yr n = 429	Hospitalized patients 7 hospitals	Full I: referral given and Bl: 1 (30 min) with no f/u	6 mo 75%	2: + reduction 5: + referrals	(+) Effect	3/3
Israel Y <sup>64</sup>	1996	Cohort	Adults n = 105	Primary care 42 practitioners	Advice with book (control) Bl: 1 (30 min) 6 (20 min) f/u sessions	12 mo 70%	1: + reduction GGT levels 2: + reduction 3: + reduction 4: + reduction	(+) Effect	2/3
\$Bernstein E <sup>65</sup>	1997	Cohort	≥21 yr n = 245	ED	Bl: (15-20 min) No f/u sessions	2 mo 22%	2: + reduction 5: + referrals	(+) Effect	2/3

Table continues

TABLE 5. (cont.)

First Author	Year	Study Design	Population/ Age	Setting	Intervention	Follow-up Rate	Outcome*	Conclusion	Grade
Dunn CW <sup>66</sup>	1997	Cohort	Adults n = 363	Hospitalized pts referred by hospital staff with alcohol and other drug problems (83% dependent)	BI: (unknown time)	1-2 weeks	5: + referrals	(+) Effects	1/3
Greber RA <sup>67</sup>	1997	Cohort	≥ 18 yr n = 30	Inpatient trauma unit	BI: (unknown time) by substance abuse counseling service	2-4 weeks 74%	5: 73% did not follow recommendations for f/u	No effect	1/3
SWright S <sup>68</sup>	1998	Cohort	≥ 16 yr n = 202	ED	BI: 1 (unknown time)	6 mo 54%	2: + reduction	(+) Effect	1/3

\*1: Prevention of morbidity and mortality secondary to illnesses/injuries 2: decrease in alcohol consumption 3: decrease in ED visits/hospitalizations 4: decrease in social consequences 5: Increase in referrals and follow-up. GGT = gamma-glutamyltransferase.

†MCV = erythrocyte mean cell volume

#Hospitalized trauma patients

\$Emergency Department based study

makes the ED visit an ideal opportunity for SBI. Patients presenting to the ED are more likely to have alcohol problems than those presenting to primary care. Cherpitel<sup>73</sup> recently reported that in one metropolitan area, patients presenting to the ED were one and a half to three times more likely to report heavy drinking, consequences of drinking, alcohol dependence, or ever having treatment for an alcohol problem than patients presenting to a primary care clinic.

While there is some evidence that SBI is feasible in the ED,<sup>17,65</sup> future study is needed to determine the following questions: What is the exact message? Should it be tailored to different age groups? Who should screen and perform the intervention? What resources for follow-up are necessary? Is there benefit to performing the intervention and referral at the time of the visit? Is it cost-effective when performed in the ED?"

### CONCLUSIONS

This systematic review of the literature has demonstrated the efficacy of screening and brief intervention in 32 clinical trials, including four specifically in the ED and two with the ED as part of multiple sites. Measured outcomes, including prevention of morbidity and mortality, a decrease in consumption, fewer ED/outpatient visits and hospitalizations, a decrease in social consequences, and an increase in referrals for follow-up and /or treatment, have all been demonstrated.

The SAEM Public Health Task Force recommends that SBI for alcohol-related problems in the ED be assigned an "alpha" rating. This is based upon the fact that the existing evidence along with an overwhelming burden of suffering is sufficient to support offering SBI in the ED setting. However, the development and testing of interventions specific to the ED and certain populations are needed.

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