Brief Intervention for Hazardous and Harmful Drinkers in the Emergency Department

Gail D'Onofrio, MD, MS
Michael V. Pantalon, PhD
Linda C. Degutis, DrPH
David A. Fiellin, MD
Susan H. Busch, PhD
Marek C. Chawarski, PhD
Patricia H. Owens, MS
Patrick G. O'Connor, MD, MPH

From the Section of Emergency Medicine (D'Onofrio, Degutis, Owens), Departments of Psychiatry (Pantalon, Chawarski) and Medicine (Fiellin, O'Connor), and School of Public Health (Busch), Yale University School of Medicine, New Haven, CT.

Study objective: To determine the efficacy of emergency practitioner–performed brief intervention for hazardous/harmful drinkers in reducing alcohol consumption and negative consequences in an emergency department (ED) setting.

Methods: A randomized clinical trial (Project ED Health) was conducted in an urban ED from May 2002 to November 2003 for hazardous/harmful drinkers. Patients 18 years or older who screened above National Institute for Alcohol Abuse and Alcoholism guidelines for "low-risk" drinking or presented with an injury in the setting of alcohol ingestion were eligible. The mean number of drinks per week and binge-drinking episodes during the past 30 days were collected at 6 and 12 months; negative consequences and use of treatment services, at 12 months. A Brief Negotiation Interview performed by emergency practitioners was compared to scripted Discharge Instructions.

Results: A total of 494 hazardous/harmful drinkers were studied. The 2 groups were similar with respect to baseline characteristics. In the Brief Negotiation Interview group, the mean number of drinks per week at 12 months was 3.8 less than the 13.6 reported at baseline. The Discharge Instructions group decreased 2.6 from 12.4 at baseline. Likewise, binge-drinking episodes per month decreased by 2.0 from a baseline of 6.0 in the Brief Negotiation Interview group and 1.5 from 5.4 in the Discharge Instructions group. For each outcome, the time effect was significant and the treatment effect was not.

Conclusion: Among ED patients with hazardous/harmful drinking, we did not detect a difference in efficacy between emergency practitioner–performed Brief Negotiation Interview and Discharge Instructions. Further studies to test the efficacy of brief intervention in the ED are needed. [Ann Emerg Med. 2008;51:742-750.]

0196-0644/$-see front matter

doi:10.1016/j.annemergmed.2007.11.028

SEE EDITORIAL, P. 751.

INTRODUCTION

Alcohol problems are common in emergency department (ED) patients. In 2001, 7.6 million of the 110 million ED visits in the United States were attributable to alcohol.[1] Alcohol has been shown to be a risk factor for injury and is involved in 40% of fatal motor vehicle crashes, 60% of fatal falls, 60% of suicides/homicides, and more than 60% of fire deaths in adults,[2,3] as well as a wide range of illnesses, including hypertension and gastrointestinal problems precipitating an ED visit.[4] For population subgroups like the young and uninsured, the ED is often the primary access point to health care, and the ED visit may be the only opportunity for screening, intervention, and referral for alcohol problems. Unfortunately, alcohol screening and

Editor's Capsule Summary

What is already known on this topic

Results of randomized trials of brief emergency department (ED) interventions to decrease alcohol use have produced conflicting results.

What question this study addressed

Whether a staff-administered brief intervention decreased alcohol consumption and the negative consequences of alcohol use compared with brief scripted Discharge Instructions.

What this study adds to our knowledge

In this 500-person randomized trial of non–alcohol dependent ED patients with a concerning drinking history or an injury in the presence of alcohol consumption, both alcohol consumption and negative consequences of alcohol use decreased during the 1-year follow-up period. The decrease was similar for intervention and control groups.

How this might change clinical practice

Although this study demonstrates the feasibility of a staff-administered brief intervention, it provides no evidence that this intervention is superior to adequate Discharge Instructions.

intervention is not widespread, so many patients with alcohol problems are not identified and treated.[5]

The spectrum of alcohol problems ranges from hazardous use to physical dependence. Hazardous or "at-risk" drinking is defined as drinking above the National Institute on Alcohol Abuse and Alcoholism low-risk guidelines: less than or equal to 14 drinks per week and less than or equal to 4 drinks per occasion for men, and less than or equal to 7 drinks per week and less than or equal to 3 drinks per occasion for women and all older than 65 years.[6] Individuals who exceed these guidelines are at risk for future medical, social, or legal consequences. Harmful drinkers are those who present with negative consequence related to alcohol. Previous research conducted in primary care settings has demonstrated that hazardous and harmful drinkers may benefit from a one-time, brief intervention targeted at reducing alcohol use or its harmful effects.[7-9]

Brief interventions are counseling sessions ranging from 10 to 45 minutes, typically performed by nonaddiction specialists.[10] Evidence suggests brief interventions are effective in primary care[7] and inpatient trauma settings.[11] Gentilello et al[11] demonstrated that brief interventions provided to patients admitted to a trauma center were effective in significantly reducing alcohol consumption and decreasing repeated injury hospitalizations in patients who received interventions from a psychologist during their hospitalization after injury.

To date, few randomized controlled studies of brief interventions in the ED setting have been published.[12-15] All have concentrated on patients presenting with injuries, either older adolescents[12] or adults,[13-15] rather than general medical illnesses. In 3 studies, research staff performed the intervention,[12,13,15] and in 1, the intervention was computer generated.[14] The results varied. One observed a significant decrease in alcohol consumption in the intervention group,[14] 2 reported a similar decrease in alcohol consumption in the intervention and control groups but demonstrated significant reductions in negative consequences after the initial brief intervention session[12] or a booster session[13] in the intervention group, and 1 detected no difference in consumption between the intervention and control groups.[15]

The ED visit may present an opportunity for screening and brief intervention for hazardous and harmful drinking, yet unlike research in primary care settings, previous research on ED patients has not investigated the "real-life" scenarios of alcohol screening irrespective of presenting complaint, combined with brief interventions performed by emergency practitioners in an ED setting. This study assessed the efficacy of an emergency practitioner–performed intervention of less than 10 minutes in reducing alcohol consumption and negative consequences during 6- and 12-month periods.

MATERIALS AND METHODS

Study Design and Setting

We conducted a randomized, controlled, clinical trial, comparing a brief (5 to 10 minutes), motivational intervention called the Brief Negotiation Interview,[16] with scripted Discharge Instructions for hazardous and harmful drinkers, titled Project ED Health. Participants were enrolled between May 6, 2002, and November 12, 2003, after presenting to the ED of Yale–New Haven Hospital, a tertiary care urban hospital, with 70,000 annual adult ED visits. The study was approved by the Human Investigation Committee at Yale University School of Medicine (Clinical Trial registration number: NCT00443183; registered March 2007 at http://www.clinicaltrials.gov).

Selection of Participants

All patients, whether or not their primary complaint was related to alcohol, were evaluated for the study. Patients 18 years or older who reported alcohol consumption exceeding the National Institute on Alcohol Abuse and Alcoholism's low-risk limits (hazardous drinkers) or whose index ED visit was related to an injury associated with alcohol use (harmful drinkers) were eligible. Acute alcohol ingestion was defined as a serum or breathalyzer test blood alcohol concentration of greater than 0.02 mg/dL. Patients were excluded if they were non–English speaking; likely to be alcohol dependent, defined as having an AUDIT[17] score greater than 19, or drug dependent, as determined by self-reported daily use; currently enrolled in a substance abuse treatment program; seeking treatment for an acute psychiatric complaint or hospitalized for a psychiatric

problem in the past year; or critically ill, injured, or cognitively impaired.

Patients were recruited during 5 rotating 8-hour shifts per week (which occurred between 6 AM and midnight, 7 days per week). The National Institute on Alcohol Abuse and Alcoholism quantity and frequency questions used to identify hazardous drinkers,[6] (1) "In a typical week how many days do you drink?" (2) "How many drinks do you have per drinking day?" and (3) "What is the maximum number of drinks you have had on 1 occasion (24-hour period) during the past month?" were embedded in an 18-item health screen administered by trained researchers. The screen included questions related to smoking, exercise, and seatbelt use to mask alcohol as the central focus, thereby minimizing demand characteristics that have been shown previously to confound results.[7]

Patients were randomly assigned with 100-block randomization to ensure near equal numbers between 2 treatment conditions, Brief Negotiation Interview or scripted Discharge Instructions. Research associates were provided with sealed, opaque envelopes for each of the 500 randomized study identification numbers. The identification number appeared on the outside, and the assigned treatment condition was specified inside the envelope. Both the Brief Negotiation Interview and Discharge Instructions were performed by trained emergency practitioners, including attending physicians, third- and fourth-year emergency medicine residents, and physician associates. A 2-hour structured training program, including skills-based training and feedback (role play and rehearsal), was used. Training was followed by a proficiency test. Details on training procedures have been reported previously.[16]

The Brief Negotiation Interview is a manual-guided intervention[16] using techniques based on motivational interviewing, brief advice,[7] and behavioral contracting[18] and designed to be delivered in less than 10 minutes. The 4 primary steps are (1) raise the subject of alcohol; (2) provide feedback by reviewing the patient's screening data, make a connection between alcohol and the visit/illness or injury if possible, review National Institute on Alcohol Abuse and Alcoholism guidelines for low-risk drinking; (3) enhance motivation with motivational interviewing techniques; and (4) negotiate and advise by summarizing the patient's reasons for change and negotiating a drinking goal. Patients are then asked to complete and sign a drinking agreement.

Patients assigned to the Discharge Instructions condition received scripted Discharge Instructions read by the emergency practitioner, designed to be less than 1 minute in length (AppendixE1, available online at http://www.annemergmed.com). This included a statement recommending that the patient decrease alcohol intake and, if appropriate, use seatbelts, exercise regularly, and stop smoking. A handout was provided with more information related to all identified health risks.

Baseline assessment included alcohol consumption for the past 30 days, as measured by the Time Line Follow-Back method,[19] a calendar-based assessment in which patients are asked to recall their drinking behavior during the past 30 days by looking at a calendar, recording the number of drinks consumed daily, starting with the previous day and working back and using holidays or special occasions as memory triggers. Reliability and validity of this instrument has been well documented.[20] Assessment also included questions concerning drinking-related consequences such as driving after drinking, injury sustained while drinking, and legal problems such as arrests. Readiness to change drinking behavior was assessed with the Contemplation Ladder,[21] a brief measure of motivation or readiness to change, allowing patients to indicate their motivation to change their drinking from 1 to 10, in which 1 is least motivated and 10 is most motivated. The Short Form Health Survey[22] was used to assess health status in 2 domains, physical and mental, including summary measures and overall general health perceptions. The Treatment Services Review[23] was used to document both inpatient and outpatient use of services.

Patients were contacted by telephone for follow-up interviews at 6 and 12 months. Interviews were conducted by research associates blinded to subject treatment assignment. Patients received travel checks as compensation after completing each assessment in the following amounts: $20 at intake visit from a research associate, and by mail in the amounts of $40 and $50 at 6 and 12 months, respectively.

To assess treatment integrity, all Brief Negotiation Interview and Discharge Instructions sessions were audiotaped. Tapes were rated, using an adherence scale of critical emergency practitioner actions, by independent trained raters blinded to study hypotheses and treatment assignment. A Brief Negotiation Interview Adherence and Competence scale was developed. Three raters were trained for reliability during a 4-hour training session. Raters were then assigned tapes to review, with the understanding that the recordings could be of either Brief Negotiation Interview or Discharge Instructions interventions, and instructed to complete an adherence form (Brief Negotiation Interview Adherence and Competence Scale) for each.

According to an initial sample of 25 audiotaped sessions, the 18 items of the final scale had good mean agreement (83.5%). Results from the remaining audiotaped interventions (N=367) demonstrated that emergency practitioners correctly administered nearly all of the Brief Negotiation Interview and Discharge Instructions techniques, with an overall mean Brief Negotiation Interview adherence score of 8.9 of 13. Ratings confirmed the presence of specific counseling strategies in the Brief Negotiation Interview and the absence of these strategies in Discharge Instructions, as well as the length of sessions: 5 to 10 minutes (Brief Negotiation Interview) versus less than or equal to 1 minute (Discharge Instructions). Brief Negotiation Interview sessions contained significantly more counseling strategies than Discharge Instructions sessions (mean 8.9 vs 0.5, respectively), as expected. Brief Negotiation Interview sessions

were significantly longer than Discharge Instructions sessions (mean 6.7 versus 1.4 minutes, respectively). These findings suggest that the emergency practitioners performed competently and adhered to the specific components of both Brief Negotiation Interview and Discharge Instructions.

Outcome Measures

Primary outcome measures were number of standard drinks per week, number of binge episodes (greater than 4 drinks for women and greater than 5 drinks for men) in the past 30 days, and percentage of participants in each treatment condition who exceeded National Institute on Alcohol Abuse and Alcoholism low-risk drinking limits in the past month. Secondary outcomes measures were potential and actual negative consequences related to drinking, patterns of primary medical care and alcohol-related treatment services utilization, as measured by the Treatment Services Review, and readiness to change drinking patterns.

Primary Data Analysis

According to published data,[7] we anticipated a moderate effect size of 0.33 in differences favoring Brief Negotiation Interview compared with Discharge Instructions in the number of standard drinks per week. The sample size of 500 subjects provided a statistical power of greater than 0.80 and a 2-sided type I error of 0.05 to detect a similar or larger effect size difference between the 2 conditions.

We estimated observing a 20% difference in the use of primary care or supportive services for follow-up of alcohol problems between the groups. The proposed sample of 500 patients allowed sufficient power (0.95 to 0.99) to detect such effects, assuming a type I error of 0.05.

We used the mixed models procedure (SAS, release 9.0; SAS Institute, Inc., Cary, NC) to compare the effects of treatment assignment (Brief Negotiation Interview versus Discharge Instructions), the effects of time (baseline, 6 months, and 12 months), and the interactions of these 2 factors on the primary and secondary outcome measures (the mean number of drinks per week and the number of binging episodes). The mixed models procedure is designed for unbalanced repeated measures with missing data, allowing for intrasubject serial correlation and unequal variance and covariance structure across time. It provides tests of the overall between-subject effects, repeated measures (time) effects, and tests of fixed and random effects and also allows analysis of reduced models that can provide detailed tests of a specific pattern of results. The secondary outcome measures were analyzed with nonparametric tests, comparing changes between the 2 groups from baseline to 12 months only.

We also conducted exploratory linear and logistic regression analyses to investigate the potential impact of baseline patient characteristics and treatment assignment on drinking over National Institute on Alcohol Abuse and Alcoholism limits and reduction of drinking from baseline: sex, baseline, AUDIT score, treatment arm, drinks per week, age, education level, marital status, ethnicity, race, insurance status, smoking status, level of motivation, and presence of injury at ED visit.

Table 1. Characteristics of subject population.

Characteristics	Treatment (Brief Negotiation Interview) (n=247) No. (%)	Control (Discharge Instructions) (n=247) No. (%)
Sex		
Male	167 (68)	169 (68)
Female	80 (32)	78 (32)
Age, y, mean (SD)		
Male	33.8 (15.2)	36.0 (15.6)
Female	34.5 (16.4)	35.1 (17.4)
Marital status		
Single	172 (70)	153 (62)
Widowed, divorced, separated	19 (8)	27 (11)
Married or living as married	56 (22)	67 (27)
Education		
High school or less	106 (43)	128 (52)
Some college	98 (40)	80 (32)
College degree or more	43 (17)	39 (16)
Race/ethnicity		
White	168 (68)	162 (66)
Black	51 (21)	50 (20)
Hispanic	23 (9)	30 (12)
Other	5 (2)	5 (2)
Insurance coverage, total	201 (81)	190 (77)
Private (HMO/private)	157 (78)	139 (73)
Medicare/Medicaid	28 (14)	29 (15)
Other	16 (8)	22 (12)
Primary physician	155 (63)	148 (60)
Usual source of care		
Clinic	69 (28)	70 (28)
ED or no place	64 (26)	73 (30)
Private doctor	114 (46)	104 (42)
General health status		
Excellent to good	220 (89)	216 (87)
Injured at ED presentation	113 (46)	108 (44)
AUDIT score <8	154 (62)	163 (66)
Smoking status		
Smokes >10 cigarettes/day	85 (34)	95 (38)
Smokes <10 cigarettes/day	40 (16)	40 (16)
Motivational level, mean (SD)	3.1 (3.3)	3.5 (3.3)

HMO, Health maintenance organization.
Data are No. (%) except as shown.

RESULTS

The baseline demographic and health status characteristics of the subjects enrolled in this study appear in Table 1. The 2 groups were similar with respect to baseline characteristics. Additionally, the occurrence of an injury at ED presentation, alcohol use and problems as measured by AUDIT score, smoking status, or readiness to change did not differ significantly between the groups.

A flow diagram is provided in the Figure. A total of 250 patients were randomized to both Brief Negotiation Interview and Discharge Instructions groups, and 247 were subsequently analyzed in each group. Three patients in the Brief Negotiation

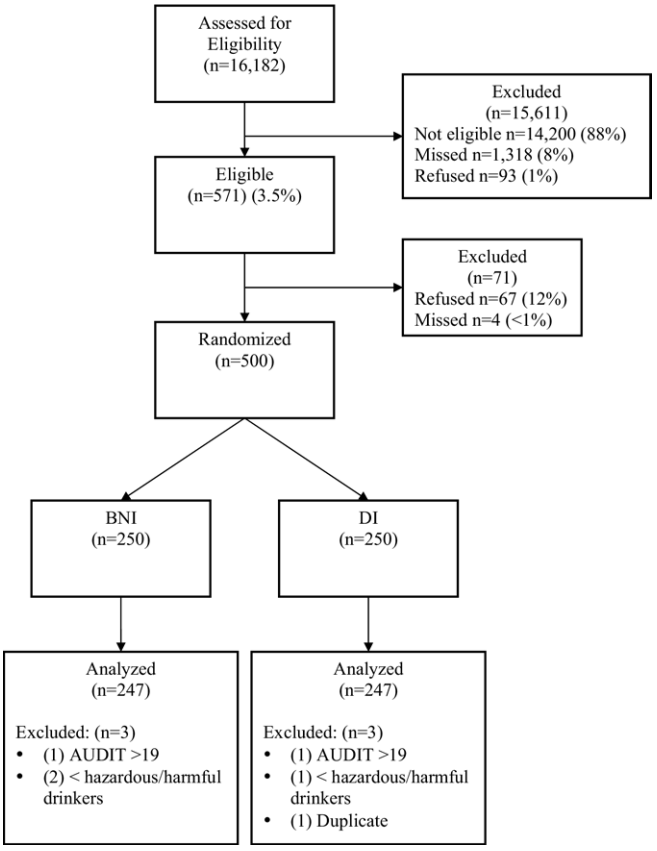

Figure. Flow diagram. *BNI,* Brief Negotiation Interview; *DI,* Discharge Instructions.

Interview group did not receive the intervention because of developing critical illness but were all included in an intention-to-treat analysis. Follow-up rates were high and comparable in both groups; 95% at 6 months and 92% at 12 months. High follow-up rates were obtained by efforts previously reported.[24] Multiple alternate contact information was obtained from patients at the intake visit. Appointments were made for follow-up at the index visit or with each subsequent telephone call that were convenient for the patient. Reminder letters were sent before the call, and the research associates called at all times of the day, 7 days a week.

Alcohol use was assessed with 2 common measures of alcohol consumption: average number of drinks per week and number of binge episodes in the past month (Table 2). In the Brief Negotiation Interview group, the mean number of drinks per week at 12 months was 3.8 less than the 13.6 reported at baseline. The Discharge Instructions group decreased 2.6 from 12.4 at baseline. Likewise, binge-drinking episodes per month decreased by 2.0 from a baseline of 6.0 in the Brief Negotiation Interview group and 1.5 from 5.4 in the Discharge Instructions group. For each outcome, the time effect was significant and the treatment effect was not.

Alcohol use was assessed in the context of the National Institute on Alcohol Abuse and Alcoholism guidelines concerning alcohol consumption and health. As expected, at baseline the proportion of subjects who met criteria for hazardous drinking was 99.2% in the Brief Negotiation Interview group and 98.0% in the Discharge Instructions group. The few patients who did not meet the criteria for hazardous drinking were enrolled because of their presenting complaint of an injury associated with concurrent alcohol use (harmful drinking). The percentage who continued to meet criteria for hazardous drinking decreased during treatment in both groups (to 62.0% and 65.4%, respectively), demonstrating improvement over time within groups ($P<.001$). However, there was no difference detected between the 2 treatment groups ($P=.6$).

Exploratory regression analyses for all patients revealed that none of the investigated variables were associated with decreases in drinking over National Institute on Alcohol Abuse and Alcoholism limits. However, consuming more drinks per week, younger age, and being married were associated with significant reductions in drinking from baseline in both treatment groups (Table E1, available online at http://www.annemergmed.com).

All variables were tested with count, nonparametric data at baseline and at 12 months.

Six potential drinking-related negative consequences were measured (Table 3). Of the 3 consequences related to alcohol use and driving (driving after drinking, arrest for driving while under the influence, and being involved in a motor vehicle crash while intoxicated) only 1, driving after drinking, demonstrated a decrease over time. There was no change between treatment groups for these 3 measures.

Similarly, there was a decrease in occurrence of injuries while drinking over time from baseline to 12 months. There were no differences related to injury occurrence, days of missed work, and legal problems between the groups.

A review of treatment services utilization was performed for both inpatient and outpatient health services (Table 4). Rates of all inpatient service (eg, hospitalization) utilization for study subjects were low overall and did not differ significantly between the groups. We did observe a small increase in substance abuse and mental health service use in both groups.

There was a 10% increase in overall outpatient services utilization in both groups. All patients received a referral for follow-up care at discharge. Overall, greater than 68% of individuals had at least 1 outpatient visit in the 12 months after ED enrollment visit. However, the rate of utilization of these outpatient treatment services did not differ by treatment group. Patients in both treatment arms had few ED or substance abuse and mental health outpatient visits in the following 12 months, and there was no significant difference between the groups in the utilization of these services.

Readiness to change was assessed at baseline, 6 months, and 12 months for both groups. Overall, the readiness score did increase over time for both treatment groups, but there was no treatment effect.

LIMITATIONS

There are a number of limitations to our study. First, we relied on self-report of alcohol consumption as the primary

Table 2. Outcomes: Alcohol consumption.

Outcomes	Baseline, Mean (SD), 95% CI	6 mo,* Mean (SD), 95% CI	12 mo,† Mean (SD), 95% CI	Time Effect	Treatment Effect
Average drinks per week, No.					
Treatment (BNI)	13.6 (11.6)	9.4 (14.9)	9.8 (14.3)	$P<.001$	$P=.4$
	12.1–15.0	7.5–11.4	8.0–11.7		
Control (DI)	12.4 (8.7)	9.1 (11.8)	9.8 (10.9)		
	11.4–13.5	7.6–10.6	8.4–11.2		
Binge episodes in past mo, No.					
Treatment (BNI)	6.0 (6.8)	3.4 (6.0)	4.0 (6.7)	$P<.001$	$P=.7$
	5.1– 6.9	2.7–4.2	3.1– 4.9		
Control (DI)	5.4 (5.4)	3.6 (6.2)	3.9 (6.2)		
	4.7– 6.1	2.8– 4.4	3.1– 4.7		
Proportion over NIAAA Guidelines (weekly and binge combined)					
Treatment (%) (BNI)	245/247 (99.2)	151/233 (64.8)	142/229 (62.0)	$P<.001$	$P=.6$
Control (DI)	242/247 (98.0)	154/236 (65.3)	149/228 (65.4)		

Statistical test used for table was mixed model procedure.
NIAAA, National Institute on Alcohol Abuse and Alcoholism.
*Ninety-five percent follow-up rate.
†Ninety-two percent follow-up rate.

Table 3. Negative consequences.

Negative Consequences	Baseline, No. (%)	12 mo, No. (%)	Time Effect	Treatment Effect
Driven after drinking ≥1 time				
Treatment (BNI)	84/247 (34.0)	47/229 (21.0)	0.001	0.9
Control (DI)	84/247 (34.0)	46/227 (20.3)		
Arrested or pulled over for driving under the influence				
Treatment (BNI)	2/247 (0.8)	3/229 (1.3)	0.7	1.0
Control (DI)	1/247 (0.4)	2/227 (0.9)		
Motor vehicle crash while intoxicated				
Treatment (BNI)	2/247 (0.8)	0/229 (0)	1.0	0.5
Control (DI)	1/247 (0.4)	1/227 (0.4)		
Injured while drinking ≥1 time				
Treatment (BNI)	18/247 (7.3)	7/229 (3.1)	0.037	0.4
Control, (DI)	12/247 (4.9)	9/227 (4.0)		
Contact with legal system				
Treatment (BNI)	20/247 (8.1)	35/229 (15.4)	0.1	0.5
Control (DI)	32/247 (13.0)	30/227 (13.2)		
Missed 1 workday (past 30 days), n=No. patients reporting employment				
Treatment (BNI)	103/208 (49.5)	81/184 (44.0)	0.5	0.9
Control (DI)	88/201 (43.8)	79/179 (44.1)		

All variables were tested with count, nonparametric data at baseline and at 12 months.

outcome measure. In an effort to decrease potential bias, researchers instructed patients to answer accurately, that there were no right or wrong answers, and that all information was confidential. In addition, questions about alcohol were embedded within other health screening questions at intake and telephone follow-up assessments. Self-report by telephone using Timeline Follow-Back methods after an initial face-to-face interview has been demonstrated in the literature to be reliable.[25-27]

There are many methodologic challenges in performing ED-based interventions that may have contributed to the lack of impact of brief intervention on reduction in alcohol consumption in these studies.[28] First, all studies had lengthy assessments that in one form or another contained some elements of the intervention, and so-called assessment reactivity may have acted as a de facto intervention. Daeppen et al[15] attempted to control for this by including a nonassessment group but also reported no differences between the control and intervention groups. In the current study, the Discharge Instructions group also received brief advice (less than 1 minute), which may be more than is generally provided in usual care. Therefore, it is conceivable that either assessment reactivity or brief advice may have served as a form of attenuated treatment and decreased our ability to detect a difference between the 2 treatments.

Another example of how research context may have weakened or obscured intervention effect is highlighted in a recent article published by Saitz et al.[29] This study randomized

Table 4. Treatment services review and readiness to change.

Treatment Services Review*	Baseline, No. (%)	12 mo, No. (%)	Time Effect	Treatment Effect
Inpatient (all)				
Treatment (BNI)	19/247 (7.7)	13/229 (5.7)	0.6	0.7
Control (DI)	19/247 (7.7)	15/227 (6.6)		
Inpatient substance abuse and mental health				
Treatment (BNI)	0/247 (0)	2/229 (0.9)	0.046 (Increase)	1.0
Control (DI)	0/247 (0)	2/227 (0.9)		
Outpatient (all)				
Treatment (BNI)	146/247 (59.1)	158/229 (69.6)	0.001 (Increase)	0.7
Control (DI)	143/247 (57.9)	154/227(67.8)		
Primary care provider visit				
Treatment (BNI)	119/247 (48.2)	137/229 (60.4)	0.013 (Increase)	0.5
Control (DI)	127/247 (51.4)	144/227 (63.4)		
ED visit				
Treatment (BNI)	39/247 (15.8)	26/229 (11.5)	0.07	0.3
Control (DI)	24/247 (9.7)	19/227 (8.4)		
Substance abuse and mental health visit				
Treatment (BNI)	0/247 (0)	2/229 (0.9)	0.3	0.6
Control (DI)	2/247 (0.8)	3/227 (1.3)		

Readiness to change (based on Contemplation Ladder)

	Baseline, No. (%)	6 mo, No. (%)	12 mo, No. (%)	Time Effect	Treatment Effect
Treatment (BNI)	3.11 (3.26)	5.19 (3.86)	4.83 (3.78)	0.01	0.6
Control (DI)	3.53 (3.29)	4.42 (3.76)	4.88 (3.77)		

*All variables were tested with count, nonparametric data at baseline and at 12 months.

inpatient medical patients with the entire spectrum of unhealthy drinking behaviors to a 30-minute brief intervention or a control (usual care) group. Brief intervention had no effect on daily drinking consumption or any other secondary outcomes; however, both groups decreased their alcohol consumption.

In addition, because we excluded patients with a high likelihood of alcohol dependence, we enrolled many patients with relatively low levels of alcohol consumption. In fact, 62% and 66%, respectively, of the Discharge Instructions and Brief Negotiation Interview groups had AUDIT scores below the usual cutoff of 8. Consequently, with lower levels at baseline, it was more difficult to demonstrate a significant level of improvement. This fact may have attributed to the negative findings in the Daeppen et al[15] study because the mean number of drinks and AUDIT scores were low. One of the major strengths of the study, the high retention rate of 92% at 12 months, may also have introduced negative effects relating to social desirability bias. It is possible that patients came to identify with the program and reported behaviors that they thought would please the interviewer. To minimize this possibility, however, the researchers performing follow-up assessments were blinded to patient study arm assignment and were not the same ones who initially enrolled the patient.

DISCUSSION

Emergency practitioners performed a brief intervention for hazardous and harmful drinkers during the constraints of an ED visit. This study is unique in that it reports the feasibility of using existing clinical staff as opposed to research or ancillary counseling staff to perform an alcohol intervention and to include all eligible patients regardless of presenting complaint of injury or illness. However, the significant decrease in alcohol consumption at 6 months that persisted at the 12-month follow-up was almost identical for both the control and the intervention groups. No difference between groups was found when controlling for severity of drinking, presence of injury, level of motivation, age, or sex. The observed effects translate into an average decrease of alcohol consumption per week of 3.8 drinks, or 28%, from baseline to 12 months in the Brief Negotiation Interview group and of 2.6 drinks, or 21%, for the Discharge Instructions group during the same period. Additionally, there was a decrease of 2.0, or 33%, binge episodes in the Brief Negotiation Interview group from baseline to 12 months and 1.5, or 28%, in the Discharge Instructions group. Although no statistical difference between the groups was found, these reductions in number of drinks per week and number of binge episodes in the past month are clinically relevant. Whether this is the result of a regression to the mean phenomenon or some other factor that we cannot identify at this time is unknown.

Although there is evidence that brief intervention is effective in other settings such as primary care and inpatient trauma centers, the current study's negative findings for the primary outcome of alcohol consumption is similar to that of other ED studies previously published.[12,13,15]

Longabaugh[13] studied injured adults treated and released in the ED who met inclusion criteria for hazardous or harmful drinking by scoring greater than 8 on the AUDIT or having a positive alcohol level at the time of injury. At 1 year, patients assigned to standard care, brief intervention alone, or brief intervention with a booster all had reduced their drinking. However, patients who received the brief intervention with booster reduced their alcohol-related negative consequences and presence of alcohol-related injuries. Monti et al[12] studied a brief motivational interview in 18- to 19-year-olds treated in an ED after an alcohol-related event. At 6 months, both motivational interview and control groups decreased their alcohol consumption, but the motivational interview group had a significantly lower incidence of drinking and driving, traffic violations, alcohol-related injuries, and alcohol-related problems. In a separate study, Fleming et al[7] reported a significantly greater reduction in drinking in the intervention group compared with controls in a primary care setting but also observed a 20% reduction in alcohol use in the control groups.

Monti et al[12] and Longabaugh et al[13] reported a decrease in negative consequences. In this study, we found a similar decrease in alcohol-related injuries in both groups. However, in all studies the actual numbers of negative consequences at baseline and follow-up are low, making interpretation difficult. Larger numbers would necessitate multicenter trials.

Two recently published trials studying the efficacy of interventions among injured, at-risk drinkers in the ED[14,30] provide additional support for the efficacy of brief intervention in the ED. Blow et al[30] studied 4 interventions with and without tailored messages and advice for reducing alcohol consumption and consequences in 575 injured patients. Each group significantly decreased alcohol consumption from baseline to 12-month follow-up, with those in the first group significantly decreasing their weekly alcohol consumption by 48.5% ($P<.0001$). In this study, there was no control group for comparison.

Neumann et al[14] used a computer-generated brief intervention for at-risk drinkers who presented with minor injury to a German ED. The intervention group had a significant decrease in alcohol intake at 6 months compared with a control group (35.7% decrease compared with 20.5% decrease in controls) ($P=.006$). This significant decrease persisted at 12 months.

In the current study, participants had a relatively high rate of utilization of health care services. In the 6 months after the ED intake visit, participants had an average of 3 primary care visits. We found that 84% of participants had at least 1 outpatient visit, and 56% had at least 1 primary care visit in the 6 months after their ED intake visit, suggesting an opportunity for primary care follow-up. Perhaps a booster at the primary care visit may have enhanced a reduction in drinking and, similar to what Longabaugh et al[13] found, substantially decreased negative consequences.

Finally, we were not able to detect a difference in drinking outcomes between the brief intervention and discharge instruction groups. Although brief intervention may be a promising approach toward intervening with unhealthy drinkers in the ED, the evidence is mixed, and there are many more questions that need to be addressed. What is the minimal "dose" of the intervention that may be successful in changing alcohol consumption? For which patients might such an intervention be beneficial? For example, must there be a clear connection with one's drinking and the ED visit for change to occur? In the Gentilello et al[11] study, which revealed a positive result, an injury severe enough to necessitate an admission may have served as a motivator itself. Studies with positive findings tended to enroll patients with higher drinking amounts at baseline.[11,14] The use of the National Institute on Alcohol Abuse and Alcoholism guidelines as the enrollment criteria may represent too low of a drinking level to permit a detection of change. Perhaps interventions targeted for specific age groups and conditions may be more successful. How, by whom, or by what methods (ie, face to face, telephone, computer-assisted, or Web site) should these interventions be delivered? In addition, how should assessments be obtained, by person-to-person telephone conversations or more sophisticated methods such as interactive voice response[31] or Web-based entry? Finally, screening and brief intervention for alcohol problems is being widely adapted in clinical practice in EDs. Although we applaud these efforts and support the need for interventions for alcohol problems, we recommend that the components of the interventions that lead to success be identified to allow for adoption of evidence-based practices and policies.

Supervising editor: David L. Schriger, MD, MPH

Author contributions: All authors participated in the study design and interpretation of study data. GD, MVP, LCD, and PHO collected data. GD, DF, SHB, MCC, and PGO analyzed the data. GD, MCC, and PGO prepared the initial article draft. All authors critically reviewed the article, approved the final version, and participated in the decision to submit for publication. GD takes responsibility for the paper as a whole.

Funding and support: By *Annals* policy, all authors are required to disclose any and all commercial, financial, and other relationships in any way related to the subject of this article, that might create any potential conflict of interest. See the Manuscript Submission Agreement in this issue for examples of specific conflicts covered by this statement. Funded by National Institute on Alcohol Abuse and Alcoholism grant R01 AA12417-01A1 (Dr. D'Onofrio), National Institute on Drug Abuse grant K23 DA15144 (Dr. Pantalon), and Robert Wood Johnson Generalist Physician Faculty Scholar Award (Dr. Fiellin).

Publication dates: Received for publication July 25, 2007. Revision received October 23, 2007. Accepted for publication November 8, 2007. Available online April 23, 2008.

Presented at the Society for Academic Emergency Medicine annual meeting, May 2005, New York, NY; and the Research Society on Alcoholism annual meeting, June 2005, Santa Barbara, CA.

Reprints not available from the authors.

Address for correspondence: Gail D'Onofrio, MD, MS, Section of Emergency Medicine, Yale University School of Medicine, 464 Congress Ave, Suite 260, New Haven, CT 06519; 203-785-4404, fax 203-785-4580; E-mail gail.donofrio@yale.edu.

REFERENCES

1. McDonald AJ, Wang N, Camargo CA. US emergency department visits for alcohol-related diseases and injuries between 1992 and 2000. *Arch Intern Med.* 2004;164:531-537.
2. Brewer RD, Morris PD, Cole TB, et al. The risk of dying in alcohol-related automobile crashes among habitual drunk drivers. *N Engl J Med.* 1994;331:513-517.
3. Smith SM, Goodman RA, Thacker SB, et al. Alcohol and fatal injuries; temporal patterns. *Am J Prev Med.* 1989;52:296-302.
4. O'Connor PG, Schottenfeld RS. Patients with alcohol problems. *N Engl J Med.* 1998;338:592-602.
5. Rockett IR, Putnam S, Jia H, et al. Assessing substance abuse treatment need: a statewide hospital emergency department study *Ann Emerg Med.* 2003;41:802-813.
6. National Institute on Alcohol Abuse and Alcoholism. Helping Patients Who Drink Too Much: A Clinician's Guide. 2005 Edition. Bethesda, MD: National Institute on Alcohol Abuse and Alcoholism; 2005. NIH publication No. 05-3769.
7. Fleming MF, Barry KL, Manwell LB, et al. Brief physician advice for problem alcohol drinkers: a randomized controlled trial in community-based primary care practices. *JAMA.* 1997;277:1039-1045.
8. Screening and behavioral counseling interventions in primary care to reduce alcohol misuse: recommendation statement. US Preventive Services Taskforce. *Ann Intern Med.* 2004;140:554-556.
9. Whitlock EP, Polen MR, Green CA, et al. Behavioral counseling interventions in primary care to reduce risky/harmful alcohol use by adults: a summary of evidence for the US Preventative Services Taskforce. *Ann Intern Med.* 2004;140:557-568.
10. Miller WR, Rollnick S. *Motivational Interviewing: Preparing People to Change Addictive Behavior.* 2nd ed. New York, NY: Guilford Press; 2002.
11. Gentilello LM, Rivara FP, Donovan DM, et al. Alcohol interventions in a trauma center as a means of reducing the risk of injury recurrence. *Ann Surg.* 1999;230:473-484.
12. Monti PM, Spirit A, Myers M, et al. Brief intervention for harm reduction with alcohol-positive older adolescents in a hospital emergency department. *J Consult Clin Psychol.* 1999;67:989-994.
13. Longabaugh RH, Woolard RF, Nirenberg TD, et al. Evaluating the effects of a brief motivational intervention for injured drinkers in the emergency department. *J Stud Alcohol.* 2001;62:806-816.
14. Neumann T, Neuner B, Weiss-Gerlach E, et al. The effect of computerized tailored brief advice on at-risk drinking in subcritically injured trauma patients. *J Trauma.* 2006;61:805-814.
15. Daeppen JB, Gaume J, Bady P, et al. Brief alcohol intervention and alcohol assessment do not influence alcohol use in injured patients treated in the emergency department: a randomized controlled clinical trial. *Addiction.* 2007;102:1224-1233.
16. D'Onofrio GD, Pantalon MV, Degutis LC, et al. Development and implementation of an emergency department practitioner-performed brief intervention for hazardous and harmful drinkers in the emergency department. *Acad Emerg Med.* 2005;12:211-218.
17. Babor TF, Higgins-Biddle JC, Saunders JB, et al. World Health Organization, Department of Mental Health and Substance Dependence; AUDIT: Guidelines for Use in Primary Care. 2001.
18. Heinssen RK, Levendusky PG, Hunter RH. Client as colleague. Therapeutic contracting with the seriously mentally ill. *Am Psychol.* 1995;50:522-532.
19. Sobell LC, Sobell MB. Timeline follow-back: a technique for assessing self-reported alcohol consumption. In: Litten RZ, Allen J, eds. Measuring Alcohol Consumption: Psychosocial and Biological Methods. Totowa, NJ: Humana Press; 1992:41-72.
20. Sobell LC, Sobell MB. Alcohol consumption measures. In: Allen P, Wilson VB, eds. *Assessing Alcohol Problems: A Guide for Clinicians and Researchers.* 2nd ed. Bethesda, MD: National Institute on Alcohol Abuse and Alcoholism; 2003:75–99.
21. Biener L, Abrams DB. The Contemplation Ladder: validation of a measure of readiness to consider smoking cessation. *Health Psychol.* 1991;10:360-365.
22. Ware J Jr, Kosinski M, Keller SD. A 12-item short-form health survey: construction of scales and preliminary tests of reliability and validity. *Med Care.* 1996;34:220-233.
23. McLellan TA, Zanis D, Incmikoski R. *Treatment Service Review (TSR).* Philadelphia, PA: Center for Studies in Addiction, Department of Psychiatry: Philadelphia VA Medical Center and the University of Pennsylvania; 1989.
24. Woolard RH, Carty K, Wirtz P, et al. Research fundamentals: follow-up subjects in clinical trials: addressing subject attrition. *Acad Emerg Med.* 2004;11:859-866.
25. Cohen BB, Vinson DC. Retrospective self-report of alcohol consumption: test-retest reliability by telephone. *Alcohol Clin Exp Res.* 1995;19:1156-1161.
26. Breslin C, Sobell LC, Sobell MB, et al. Aftercare telephone contacts can serve a clinical and research function. *Addiction.* 1996;91:1359-1364.
27. Gruenewald PJ, Johnson FW. The stability and reliability of self-reported drinking measures. *J Stud Alcohol.* 2006;67:738-745.
28. Saitz R, Svikis D, D'Onofrio G, et al. Challenges applying alcohol brief interventions in diverse settings: populations, outcomes and costs. *Alcohol Clin Exp Res.* 2006;30:332-338.
29. Saitz R, Palfai TP, Cheng DM, et al. Brief intervention for medical inpatients with unhealthy alcohol use: a randomized, controlled trial. *Ann Intern Med.* 2007;146:167-176.
30. Blow FC, Barry KL, Walton MA, et al. The efficacy of two brief intervention strategies among injured, at-risk drinkers in the emergency department: impact of tailored messaging and brief advice. *J Stud Alcohol.* 2006;67:568-578.
31. Mundt JC, Perrine MW, Searles JS, et al. An application of interactive voice response (IVR) technology to longitudinal studies of daily behavior. *Behav Res Methods Instr Comput.* 1995;27:351-357.

APPENDIX E1. DI Script.

"Hi, I'm [practitioner name]. I would like to take a minute to provide you with some teaching materials related to your health. This will inform you about the importance of [eg, stop smoking, decrease your alcohol intake, exercise more, and wear your seatbelt]."

PROJECT ED HEALTH INFORMATION SHEET

Please read the following important information, about reducing risky health behaviors, which may apply to you.

Health Risk	What we know . . .	What you can do . . .
Smoking	• It's not healthy to smoke. • There are many options available to help you stop.	We recommend that you speak with your primary care physician for his or her advice. • Or you may call: (203) 688-9999 [8-5; M-F]
Exercise	• It's healthy to exercise on a regular basis. • The amount of exercise recommended on a daily basis is 20 minutes.	We recommend that you speak with your primary care physician for his or her advice. • Or you may call: (203) 688-9999 [8-5; M-F]
Alcohol Use	• Drinking above low risk limits will increase your risk for illness and/or injury. • It's never good to drink and drive.	We recommend that you speak with your primary care physician for his or her advice. • Or you may call: (203) 688-9999 [8-5; M-F]
Safety Issues	• It is always healthy to take safety precautions. • Always use a seatbelt when in a car. • Always wear a helmet while biking, riding a motorcycle or rollerblading.	We recommend that you speak with your primary care physician for his or her advice. • Or you may call: (203) 688-9999 [8-5; M-F]

Table E1. Predictors of outcome at 12 months using linear regression model with reduction in drinking from baseline (the difference between the number of drinks at baseline and at 12 months) as the dependent variable.

Predictors of Outcome	Regression Coefficient	95% CI
Average No. of drinks	0.693	0.513 to 0.874
Age, y	−0.211	−0.351 to −0.071
Marital status	−1.506	−2.584 to −0.427
Audit score	−0.335	−0.873 to 0.204
Smoker	−2.055	−5.658 to 1.547
Ethnicity	2.482	−2.108 to 7.072
Race	1.024	−0.983 to 3.030
Motivation to change	0.266	−0.264 to 0.797
Insured	−1.325	−5.162 to 2.512
Injury visit	−1.029	−4.531 to 2.472
Education	0.508	−2.025 to 3.041
Sex	0.396	−3.331 to 4.122