

# Emergency Department Brief Motivational Interventions for Alcohol With Motor Vehicle Crash Patients

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**Study objective:** This study compares the effect of a brief motivational intervention for alcohol plus a booster given to emergency department (ED) patients with subcritical injuries from a motor vehicle crash with the effect of brief motivational intervention for alcohol plus a booster in patients treated for non-motor vehicle crash-related injuries.

**Methods:** A randomized controlled trial (n=539) was conducted at an urban Level I trauma center of brief intervention (1 ED session of brief intervention), brief motivational intervention for alcohol plus a booster (1 ED session plus booster session), or standard care for injured ED patients with an alcohol use problem who were being discharged home. At 12 months, alcohol-related negative consequences and injuries were measured. We performed a secondary analysis comparing motor vehicle crash-injured patients and non-motor vehicle crash-injured patients in the study sample.

**Results:** Subcritically injured ED patients with harmful or hazardous alcohol use who received brief motivational intervention for alcohol plus a booster had fewer alcohol-related negative consequences and alcohol-related injuries than those receiving brief intervention or standard care at 12-month follow-up (previously reported). A secondary analysis of this result showed that motor vehicle crash patients (n=133) given brief motivational intervention for alcohol plus a booster (n=34) had fewer alcohol-related injuries than those receiving standard care (n=46;  $P=.001$ ). Moreover, there were no significant differences in alcohol-related injuries among the non-motor vehicle crash-injured patients who received brief intervention or standard care.

**Conclusion:** Brief motivational intervention for alcohol plus a booster is a useful intervention for subcritically injured ED patients with harmful or hazardous alcohol use. Its effects may be moderated by the cause of injury. [Ann Emerg Med. 2005;45:620-625.]

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## INTRODUCTION

### Background

Emergency physicians routinely care for injured patients, and the scientific literature documents what they already know: alcohol use has a strong association with injury.<sup>1</sup> Patients presenting for treatment of injuries in the emergency department (ED) are more likely to have histories of heavier alcohol consumption than a comparison sample of community patients,<sup>2</sup> and many injured patients are intoxicated at the time of treatment.<sup>3</sup>

A motivationally based brief intervention delivered in a primary care setting is effective in reducing alcohol use.<sup>4</sup> A

recent review of the medical literature found a positive effect of screening and a brief intervention for alcohol-related problems in 32 of 41 studies, including 4 ED-based studies.<sup>5</sup> The recently completed Rhode Island Early Intervention Study<sup>6</sup> demonstrated that a brief motivational intervention in the ED with a follow-up booster session for injured ED patients resulted in fewer subsequent alcohol-related negative consequences and alcohol-related injuries than for those who were provided only standard care. Patients with histories of hazardous drinking responded to a brief motivational intervention plus a booster session whether or not they had consumed alcohol before their injury.

**Editor's Capsule Summary***What is already known on this topic*

Alcohol use and injury are intimately related.

*What question this study addressed*

The authors conducted a subanalysis of a previous randomized controlled trial to determine whether a 40-minute motivational intervention for alcohol in patients injured in motor vehicle crashes would reduce subsequent alcohol-related negative events as measured by validated surveys.

*What this study adds to our knowledge*

Patients involved in motor vehicle crashes who had a brief intervention with a booster had fewer alcohol-related injuries at 1 year than did patients involved in other sorts of trauma.

*How this might change clinical practice*

Subsequent alcohol risk behavior of patients involved in motor vehicle crashes can be reduced by an intervention. Physicians may wish to engage in such "teachable moments" or develop the resources to routinely provide such interventions.

**Importance**

There is a particularly strong connection between alcohol use and motor vehicle crashes. The National Highway Traffic Safety Administration (NHTSA) estimates that in 2002 alcohol was involved in 40% of fatal motor vehicle crashes, and 275,000 persons were injured in motor vehicle crashes in which police reported that alcohol was involved.<sup>7</sup> Even with this documented high incidence, this probably underestimates the magnitude of the problem because it requires an investigating officer to have knowledge of alcohol use and document it.

Overall prevalence of alcohol abuse and alcohol dependence in motor vehicle crash patients treated in the ED has been estimated at 23%, with almost half of these patients being alcohol negative at their ED visit.<sup>8</sup> Thus, at least 1 in 5 motor vehicle crash patients is a candidate for an intervention for alcohol use. NHTSA, in a February 2002 report, concluded that an ED protocol for screening and intervention for patients at high risk of alcohol abuse or alcohol dependency increases the likelihood of patients receiving definitive treatment for these conditions.<sup>9</sup> Runge<sup>10</sup> has suggested that further research be directed at identifying subgroups of injured patients that are likely responsive to a brief motivational intervention and suggests that ED patients injured in motor vehicle crashes may be one such group.

**Goals of This Investigation**

In this analysis, we examine whether ED patients who were being treated for injuries from a motor vehicle crash were more

responsive to our intervention aimed at reducing hazardous drinking than other injured ED patients by comparing alcohol-related negative consequences and alcohol-related injuries 12 months after the initial ED visit.

**MATERIALS AND METHODS****Study Design**

We conducted a secondary analysis of a randomized controlled trial of a brief motivational intervention for alcohol presented to injured ED adult patients. The university and the hospital institutional review boards approved all procedures.

**Setting**

Patients were selected for the original trial from an ED of an urban, university teaching hospital Level I trauma center.

**Selection of Participants**

Study participants were eligible if they were 18 years or older, presented in the ED with an injury that did not result in admission to the hospital, and were assessed as a hazardous or harmful drinker, which was defined by any 1 of 3 criteria: (1) they tested breath-alcohol positive while in the ED; (2) they reported ingesting alcohol within the 6 hours before their injury; or (3) they scored positive for harmful or hazardous drinking on the Alcohol Use Disorders Identification Test (AUDIT). Ineligibility criteria included being previously diagnosed as being alcohol dependent, no identifiable residence, and not speaking English or Spanish. During the sampling period, 2,835 out of a total of the 3,756 nonadmitted ED patients who were identified were found to be ineligible. Three hundred eighty-two of the remaining 921 patients refused to participate. Those who refused, compared to those who accepted, were found to be similar in terms of sex and ethnicity but dissimilar in terms of age (31 versus 27 years old) and marital status (22% unmarried versus 12% married).

Two groups were retrospectively identified for the current study as either motor vehicle crash or non-motor vehicle crash. Motor vehicle crash patients included all patients whose injury was related to being a driver or a passenger in a motor vehicle crash (status as a driver versus a passenger was not recorded in the database). Non-motor vehicle crash injuries were related to sports, assaults, occupational, and other types of unintentional and intentional injuries.

**Interventions**

After baseline assessment was completed, patients were randomly assigned to 1 of 3 treatment conditions: standard care, brief intervention, or brief intervention plus booster. For patients in standard care, the standard practice for ED medical care was followed. Standard care included medical treatment of the injury, and any discussion or treatment directed at the patient's alcohol use was at the treating physician's discretion. Patients who were found to be intoxicated were detained in the ED until their blood alcohol level was less than 100 mg/dL. Baseline assessment was completed during routine waiting time

to avoid interfering with active medical treatment. Typical length of stay time for patients in the ED was 3.5 hours.

Patients assigned to the brief motivational intervention and brief motivational intervention plus a booster group participated in the intervention. The brief intervention session was conducted in the ED during time that did not interfere with active medical treatment by study interventionists and lasted approximately 40 minutes. For patients who were discharged from the ED before the completion of the brief intervention, the brief intervention was completed in a research room that was located adjacent to the ED. The 8 interventionists had varied educational backgrounds: 2 doctoral level, 3 masters level, and 3 baccalaureate level. Interventionists received extensive training in motivational interviewing and during the study met with clinical supervisors weekly to ensure treatment fidelity. The intervention was based on the underlying principles of motivational interviewing, an approach that uses empathic and respectful techniques and is considered opposite from confrontational approaches.<sup>11</sup> The intervention focused on the role that alcohol use may have played in the current injury and/or the exploration of the positive and negative roles that alcohol use plays generally in the patient's life.

Participants who were randomly assigned to brief motivational intervention for alcohol plus a booster were scheduled with the interventionist for a booster session (which lasted approximately 40 minutes) to take place 7 to 10 days later. The booster session, which was also based on the principles of motivational interviewing, reviewed the content of the initial session and provided further examination of the patient's alcohol use.

## Methods of Measurement

Before subject randomization, the interventionist administered an assessment battery to participants in all 3 groups. The assessment took approximately 30 to 40 minutes and included the measures that follow.

AUDIT is a 10-item self-report measure that screens for hazardous or harmful drinking.<sup>12</sup> Items include quantity and frequency of drinking and heavy drinking, symptoms of dependence, tolerance, and alcohol-related negative consequences. The AUDIT has an internal consistency  $\alpha$  of .80 and was found to reliably distinguish between patients who have a history of hazardous or harmful drinking and those who do not.<sup>12,13</sup> An AUDIT cutoff score of greater than 8 produces an 85% sensitivity and an 89% specificity for hazardous or harmful drinking.<sup>14</sup>

Drinker Inventory of Consequences (DrInC) is a 45-item self-report questionnaire on negative consequences experienced from drinking. The DrInC, which was validated on an alcohol-treatment-seeking population,<sup>15</sup> includes 5 groupings of subscale consequences: physical, intrapersonal, interpersonal, social responsibility, and impulse control. The psychometric properties of the subscales have been reported by Miller et al.<sup>15</sup> The DrInC provides a measure of negative consequences from drinking that is sensitive to change and correlated with other measures of outcome, such as percentage of days drinking, average drinks per drinking day, subjective well-being, and

measures of functioning.<sup>16</sup> The DrInC has subsequently been used in other alcohol-abusing populations.<sup>17</sup> The Lifetime version of the DrInC was administered at baseline. At this time, the patient was asked whether or not he or she had ever experienced each of these consequences. At 1-year follow-up, the patient was asked how often he or she had experienced each of these consequences in the past year.

The revised Injury Behavior Checklist (IBC) was developed as part of a comprehensive health interview called the Adolescent Health Status Instrument.<sup>18</sup> This IBC was used with adolescents and has well-established psychometric properties.<sup>19,20</sup> The IBC was revised for adults and included new items designed to measure alcohol involvement during injuries. The patient records the number of times each of 18 kinds of injuries occurred during the past year, and for each injury the patient also records whether it was treated by a physician and whether he or she was drinking within 2 hours of the injury. The IBC was administered at baseline and again at 1 year after the ED visit to monitor the previous 12-month period.

Research assistants, who were blind to treatment condition, administered the assessment instruments at the 12-month follow-up.

## Primary Data Analysis

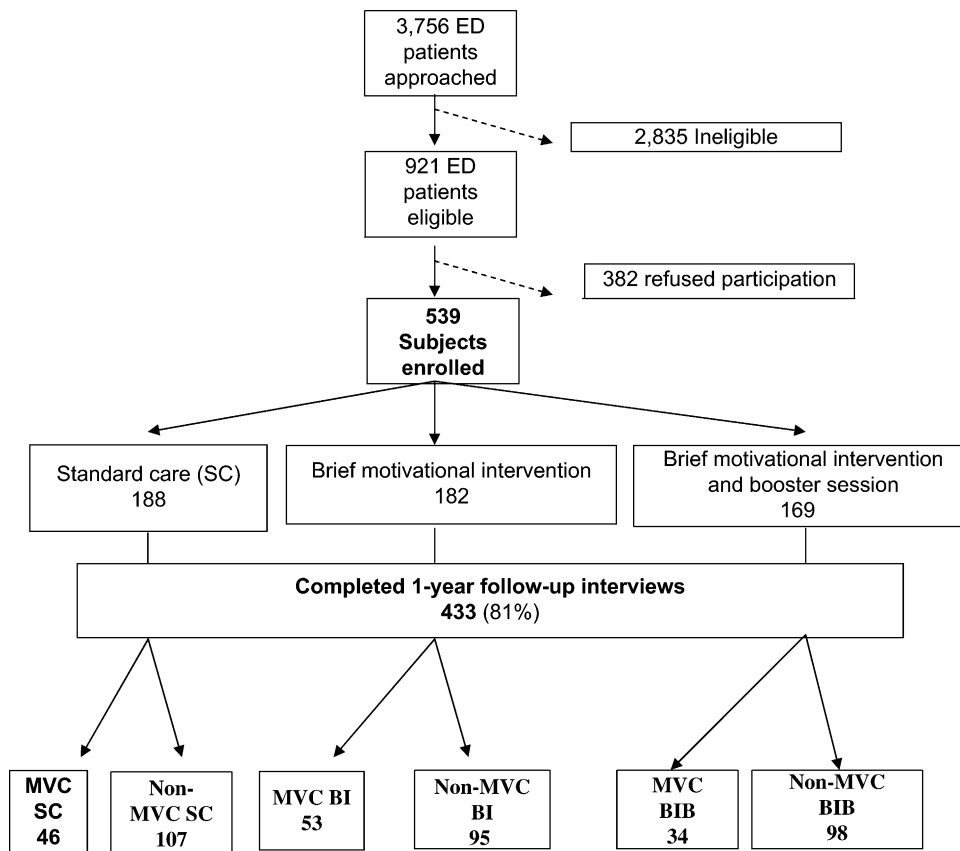
Analyses were conducted using SAS software (version 8.2, SAS Institute, Inc., Cary, NC). An analysis of covariance (ANCOVA) was conducted on the dependent variables of interest using baseline alcohol-related injuries (IBC) and baseline DrInC scores as the covariates in adjusting for 12-month IBC and DrInC scores. For the current report, the participants were grouped according to their presenting injury and type of treatment (ie, motor vehicle crash and other injuries; and brief motivational intervention for alcohol plus a booster, brief intervention, and standard care). Follow-up simple effects analyses were conducted to examine significant differences between the groups.

## RESULTS

### Characteristics of Study Subjects

A total of 539 patients were enrolled in the Rhode Island Early Intervention Study and randomly assigned to standard care (n=188), brief intervention (n=182), or brief motivational intervention for alcohol plus a booster (n=169) (Figure 1). Participants had an average baseline AUDIT score of 14.9 (SD=7.85) (a cutoff score >8 is indicative of hazardous drinking). At 1 year, follow-up interviews were obtained on 433 patients (81% of sample).

For our current study with the subgroup of enrolled motor vehicle crash patients, completed at 1 year follow-up interviews consisted of 46 patients in standard care, 53 patients in the brief intervention, and 34 patients in brief motivational intervention for alcohol plus a booster. The motor vehicle crash and non-motor vehicle crash groups did not differ in regard to age or racial composition but had a higher percentage of women (32% of motor vehicle crash versus 18% of non-motor vehicle crash).



**Figure 1.** Overall description of subject recruitment and treatment group. MVC, Motor vehicle crash patient; non-MVC, non-motor vehicle crash patient; BI, brief intervention; BIB, brief intervention and booster session; SC, standard care.

## Main Results

In the motor vehicle crash group, after controlling for baseline score, there was a significant main effect of treatment for alcohol-related injuries (IBC,  $P < .005$ ). Follow-up simple effects demonstrated that the motor vehicle crash group that received brief motivational intervention for alcohol plus a booster had significantly fewer injuries ( $n=34$ ;  $M=0.35$ ; 95% confidence interval [CI] 0 to 1.97) in comparison to the motor vehicle crash group receiving standard care ( $n=46$ ;  $M=1.14$ ; 95% CI 0 to 2.56); [Figure 2]. In groups of participants with other injuries ( $n=205$ ), there were no significant differences in the amount of 12-month injuries between the brief motivational intervention for alcohol plus a booster ( $M=1.59$ ; 95% CI 0.62 to 2.56) and standard care ( $M=0.82$ ; 95% CI 0 to 1.75). After controlling for the effect of injury type and treatment, baseline AUDIT scores did not significantly predict adjusted 12-month alcohol-related injuries ( $P > .05$ ).

Alcohol-related negative consequences (DrInC) between the motor vehicle crash and non-motor vehicle crash groups were not significantly different. However, when the overall sample was used in the original Rhode Island Early Intervention Study analyses (ie, looking at treatment condition only and not separating for presenting injury), a significant treatment effect with DrInC was reported between the brief motivational

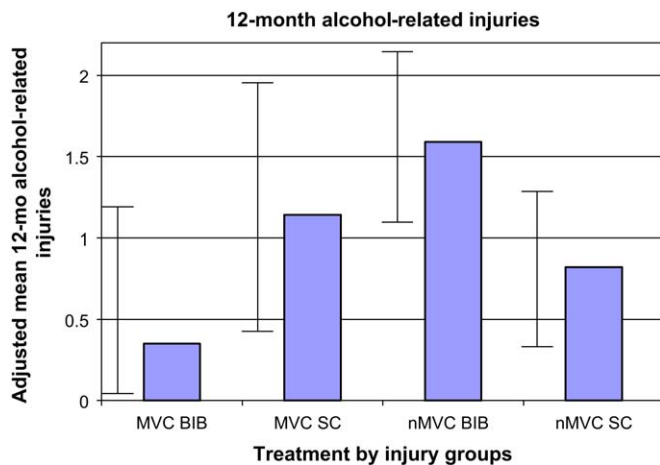
intervention for alcohol plus a booster and standard care groups.<sup>6</sup>

## LIMITATIONS

This was a secondary analysis performed on previously collected data in which testing for effect in motor vehicle crash patients was not one of the primary study aims. We had no previous hypotheses about which type of injury event would be most responsive to the intervention; thus, patients were not randomized into treatment on the basis of injury event type, which limits the external generalizability of our findings. Subgroups of injuries (eg, assaults, falls), other than for motor vehicle crash patients, were not of sufficient size to allow further comparison between subgroups. Thus, other etiologies of injury may also demonstrate differential response to treatment. The intervention was delivered in this project by trained interventionists not associated with the patients' ED care, which required a large amount of resources, limiting its applicability to certain settings, although different models of delivering this intervention are being explored.

## DISCUSSION

The Rhode Island Early Intervention Study previously has reported that a brief intervention given to injured patients in the



**Figure 2.** Alcohol-related injuries at 12 months by treatment group in motor vehicle crash and non-motor vehicle crash groups. Error bars represent 95% CIs around the mean. *nMVC*, Non-motor vehicle crash patient.

ED with a follow-up booster session reduces alcohol-related injuries and negative consequences at 12-month follow-up.<sup>6</sup> The secondary analysis of the Rhode Island Early Intervention Study data presented here demonstrates that for patients with an injury sustained in a motor vehicle crash, at 12-month follow-up the brief motivational intervention for alcohol plus a booster group had a third of the alcohol-related injuries compared with the motor vehicle crash group that received standard ED care.

The reason for motor vehicle crash or any injury type being a moderating variable for the treatment effect was not explored in this analysis, but several explanations can be hypothesized and discussed. It is doubtful that the magnitude of difference is due to the severity or type of injury incurred in the motor vehicle crash. Although an injury from a motor vehicle crash can be devastating or even lethal, all patients recruited into the Rhode Island Early Intervention Study (including those from a motor vehicle crash) were discharged to home after their ED visit. Thus, the motor vehicle crash injuries were subcritical and similar in overall severity to those of other enrolled patients.

The fact that there were more females in the motor vehicle crash group is noteworthy. Other analyses with this data set have suggested that brief motivational intervention for alcohol plus a booster may be more effective in women than men in preventing negative consequences (DrInC) at 12-month follow-up.<sup>21</sup> That analysis demonstrated a significant treatment effect on the DrInC but not for alcohol-related injuries (Injury Behavior Checklist), which was the substantive treatment effect found here for motor vehicle crash patients. Therefore, the intensity of the treatment effect for alcohol-related injuries is unlikely to be the result of sex differences.

A motor vehicle crash is an event that has potential significance to patients that extends beyond their resulting injury. There may be legal consequences from causing the crash

or impaired driving with either criminal or civil complaints. Others involved in the motor vehicle crash may have been more seriously injured, causing feelings of guilt and remorse for the patient. There are economic costs and inconveniences, including automobile insurance deductibles, increased insurance rates, automobile repairs or need to purchase a new vehicle, and loss of work. A motor vehicle crash is an event that has implications for an individual on many levels. This “global nuisance” may allow a motor vehicle crash to be a more potent teachable moment than other injury patterns. The initial brief intervention in the ED, proximate to the effect of the crash and the resultant injury, may prime the subject to enhance the booster session occurring a week later after the crash. That booster session is delivered when more of the non-injury-related negative effects of the crash have become apparent to the patient and may contribute to the teachable moment. This moment may actually be more of a window of opportunity, and allowing variables other than the acute pain of the injury to accumulate and contribute to it could be beneficial. Further research can delineate whether “global nuisance” is a moderator of the intervention’s outcome or whether it mediates the effect, depending on the type of injury event.

In a recent survey of physicians, most emergency physicians stated that they would screen and refer for alcohol counseling patients described in 3 case scenarios in which the driver from a motor vehicle crash was intoxicated.<sup>22</sup> In fact, ED staff are increasingly being expected to assist in reducing alcohol-impaired driving. NHTSA, the Emergency Nurses’ Association, and the American College of Emergency Physicians sponsored a conference in 2000 on Developing Best Practices of Emergency Care for the Alcohol-Impaired Patient, and the published proceedings include an endorsement of this modality in their Recommended Best Practices for Physicians.<sup>23</sup> In 2004, an American College of Emergency Physicians task force, through a grant from NHTSA, developed a resource kit, Alcohol Screening and Brief Intervention in the ED, for emergency physicians to support brief motivational interventions use by EDs, and it is available online.<sup>24</sup>

The original Rhode Island Early Intervention Study has shown that a brief intervention in the ED with a follow-up booster session 7 to 10 days later is effective in reducing alcohol-related injuries and alcohol-related negative consequences. Our present analysis suggests that a differential effect may be present, depending on the type of injury, and that the intervention was most effective in patients injured in motor vehicle crashes. EDs should consider intensifying their counseling efforts for motor vehicle crash patients because they are a subgroup that appears to benefit most from interventions that reduce future alcohol-related injuries.

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collected through research funding obtained by RL. AM and JB provided statistical advice. MJM and TDN drafted the manuscript, and all authors contributed substantially to its revisions. MJM takes responsibility for the paper as a whole.

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