Rates of At-risk Drinking among Patients Presenting to the Emergency Department with Occupational and Nonoccupational Injury

Samuel A. McLean, MD, MPH, Frederic C. Blow, PhD, Maureen A. Walton, MPH, PhD, Mary Ann Gregor, MHSA, Kristen L. Barry, PhD, Ronald F. Maio, DO, MS, Steven R. Knutzen, MS

Abstract

Objectives: To compare the characteristics and rates of at-risk drinking among patients presenting to the emergency department (ED) with occupational and nonoccupational injury. **Methods:** Cross-sectional survey of injured patients presenting to a university hospital ED. Injured patients were prospectively identified, and consenting patients completed a survey including questions regarding quantity/frequency of alcohol use, TWEAK, CAGE, and work-relatedness of injury. Major trauma and motor-vehicle collisions were excluded. Demographic and injury information was obtained from the medical record. Patients with a TWEAK score ≥3, CAGE score ≥2, or who exceeded NIAAA quantity/frequency guidelines were defined as at-risk drinkers. Analysis utilized the Student t-test for continuous variables, and frequency and chi-square analysis for categorical variables. **Results:** Among 3,476 enrolled patients, 766 (22%) had work injuries and 2,710 (78%) had nonwork injuries. Patients with work injuries were as likely as patients with nonwork injuries to be at-risk drinkers; 35% of patients with an occupational injury and 36% of those with a nonoccupational injury were at-risk drinkers (odds ratio = 0.96). **Conclusions:** Patients presenting to the ED with an occupational injury have rates of at-risk drinking similar to other injury patients, and may be an important group in which to target brief alcohol interventions. **Key words:** occupational injury; alcoholism; emergency medicine. ACADEMIC EMERGENCY MEDICINE 2003; 10:1354–1361.

Approximately 34% of nonfatal occupational injuries are treated in the emergency department (ED),[1] representing between 3.6 and 4.4 million nonfatal occupational injuries treated in U.S. EDs annually.[2,3] Only about 2% of nonfatal occupational injury patients evaluated in the ED are hospitalized; the rest are treated and released.[1]

The importance of developing interventions for patients presenting to the ED with injury with alcohol problems has been increasingly recognized. The ability of alcohol interventions to decrease injury occurrence has been demonstrated in a variety of settings.[4] Health care workers often miss the opportunity to discuss patients' alcohol problems, despite the fact that such discussions can have a significant influence on patient behavior.[5] At least 20%–30% of ED patients have alcohol problems,[6,7] and many patients who come to the ED do not obtain other regular medical care.[8,9] In addition, an injury event leading to an ED visit may constitute a ''teachable moment,'' in which individuals are more open to considering changing behaviors with negative health consequences.[10,11] Longabaugh et al. recently demonstrated the success of a brief motivational intervention in reducing alcohol-related negative consequences among those presenting to the ED with injury.[11] Notably, the intervention had as much success among problem drinkers who had not been drinking at the time of injury as among those who had been drinking at the time of injury occurrence.[11]

Developing alcohol screening and intervention for injured workers has the potential to improve employee health and work performance and to decrease employer costs. Problem drinkers have been shown to have higher rates of injury on the job,[12,13] higher rates of work absence,[14] and decreased work performance.[15] Problem drinkers also have been shown to generate greater injury-related health care costs[16] and overall health care costs.[17] The effectiveness of alcohol interventions among workers with alcohol problems

From the Departments of Emergency Medicine (SAM, MAG, RFM), and Psychiatry, Addiction Research Center (FCB, MAW, KLB, SRK), University of Michigan Medical Center, Ann Arbor, MI; and the Department of Veterans Affairs Medical Center (FCB), Ann Arbor, MI.

Received March 21, 2003; revisions received June 3 and 6, 2003; accepted June 18, 2003.

Presented at the Society for Academic Emergency Medicine Annual Meeting, St. Louis, MO, May 2001.

Supported by the National Institute on Alcohol Abuse and Alcoholism (NIAAA) R01, AA11 629-01.

Address for correspondence and reprints: Samuel A. McLean, MD, University of Michigan Department of Emergency Medicine, TCB 1354 Taubman Center Box 0303, 1500 E. Medical Center Drive, Ann Arbor, MI 48109-0303. Fax: 734-936-9414; e-mail: samclean@umich.edu.

doi:10.1197/S1069-6563(03)00538-4

has been demonstrated,[18] and among those enrolled in a health plan of a large Midwestern manufacturing corporation, alcohol treatment was found to reduce overall health care costs by 23%–55%.[19]

A number of screening instruments have been developed to identify patients at risk for adverse health consequences because of their drinking. Alcohol intoxication at the time of the ED visit is a poor screen for alcohol problems, because most of those with a significant alcohol problem are not intoxicated at the time of their ED visit.[6,20] Instead, most screening studies[6] assess both alcohol-related consequences (e.g., CAGE,[21] TWEAK,[22] AUDIT,[23] RAPS4[24]) and alcohol consumption (e.g., weekly quantity/frequency and binge episodes). The National Institute of Alcohol Abuse and Alcoholism (NIAAA) has developed cutoffs for at-risk drinking.[25] Men aged 21–65 years who drink more than 14 drinks per week, or more than four drinks per occasion, and women or those older than age 65 who drink more than seven drinks per week or more than three drinks per occasion are defined as at-risk drinkers.[25]

Although there is evidence that screening and intervention for alcohol problems among injured workers presenting to the ED could improve health and decrease costs, the rates of problem drinking among those who present to the ED with an occupational injury are unknown. Such information is needed to determine the potential utility of targeting this population of ED patients for alcohol intervention. We sought to determine the rate of at-risk drinking among patients presenting to the ED with occupational injury, and to compare the characteristics and rate of at-risk drinking among patients with occupational injury to those with nonoccupational injury.

METHODS

Study Design. This study presents cross-sectional data from the initial screening portion of a longitudinal, randomized, controlled trial of a computer-based brief alcohol intervention. Study procedures were approved and conducted in compliance with the site institution's institutional review board (IRB) for protection of human subjects.

Study Setting and Population. Injured patients presenting to a university hospital ED between August 1999 and February 2002 were recruited to participate in a computer-based survey of health issues; alcohol questions were embedded in a larger health screening survey to encourage accurate reports of drinking. The ED site for this study was a Level 1 trauma center that has an annual adult census of approximately 50,000 patients.

Study Protocol. During the entire 30-month enrollment period, a research assistant in the ED recruited patients during the evening (4 PM–12 PM). During the first 6 months of the study, additional day (8 AM–4 PM) and midnight (12 AM–8 AM) shifts also were staffed by a research assistant using a repeating 4-week staffing cycle, which consisted of three day shifts staffed each week during weeks 1–3, and three night shifts staffed during week 4. To minimize selection bias by day of the week, the three day or midnight shifts were not scheduled for the same days of the week each week, but rather were rotated in 3-day blocks across successive days of the week (e.g., week 1, day shifts Sunday, Monday, and Tuesday; week 2, day shifts Monday, Tuesday, and Wednesday). After the first 6 months of the study, because of low recruitment during midnight shifts, the midnight shifts were dropped and day shifts were staffed each day. Thus, during the final 24 months of the study, a research assistant was present each day in the ED recruiting patients between 8 AM and midnight.

Eligibility Criteria. Patients were eligible for the study if they were 19 years of age or older and had sustained an injury resulting from energy transfer (E-codes 800-968, International Classification of Diseases, 9th revision[26]) in the last 24 hours. Both admitted and nonadmitted patients were included. Eligible patients who were able to give informed consent, as determined by clinical social workers' judgments and passing the Mini-Mental Status Exam[27] (i.e., scored 18 or better), were screened with a computerized health survey using personal digital assistants. As an incentive for participation, injured patients willing to complete the survey were entered in a monthly drawing for $100. Patients who were severely injured (e.g., unconscious) or in need of immediate life-saving procedures (e.g., intubation) were excluded from the study. In addition, the following types of patients were excluded: self-inflicted injury, sexual assault, overdose, poisoning, near-drowning, chronic injury without specific event associated with re-injury, pregnant patients, prisoners, and patients who did not speak English.

Survey Content. Consenting patients completed a survey including questions regarding basic demographic information and mechanism of injury. The survey also collected information regarding alcohol consumption (including quantity and frequency in the past 3 months and number of binge episodes in the past month) and alcohol screening questionnaires (i.e., TWEAK[21] and CAGE[22]).

Data Analysis. Patients with TWEAK score ≥ 3, CAGE score ≥ 2, or who exceeded NIAAA guidelines[25] were classified as at-risk drinkers. For patients with occupational injury, research assistants reviewed the medical record from the ED visit and used Tricode Software (Digital Innovation, Forest Hill, MD) to

compute Abbreviated Injury Scale (AIS) scores for each patient. AIS scores then were used to determine the body region of injury.

The frequency of demographic characteristics was calculated for occupational and nonoccupational injury patients, and for occupational injury patients who were at-risk drinkers and non–at-risk drinkers. Comparison between the groups was performed using t-tests for continuous variables. Odds ratios (ORs) were calculated for categorical variables, using Mantel-Haenszel chi-square analysis. Unadjusted, rather than adjusted, ORs were calculated, given that the study purpose was to screen a particular injury population, and not to examine the risk of at-risk drinking on an individual level. A p-value of <0.05 was considered significant. SAS software (version 8e, SAS Institute, Cary, NC) was used for statistical analysis. The sample size of those with occupational and nonoccupational injury provided a power >0.8 to detect OR ≤ 0.8 or ≥ 1.2 for odds of being an at-risk drinker between the two groups.

RESULTS

A total of 6,047 potentially eligible patients presented to the ED during the study recruitment period (Figure 1). Five hundred seven (8.3%) were missed. Of the 5,540 patients approached for participation in the study, 4,476 (80.8%) consented to participate in the study and 1,064 (19.2%) refused. Of the 4,476 participants, 3,478 (77.7%) were asked: "Did your injuries occur while you were at work?" and 998 (22.2%) were not asked this question. Two patients who were asked did not provide a response, leaving a group of 3,476 patients for whom occupational injury data were obtained.

Among the 507 potentially eligible patients who were missed, the following reasons were recorded:

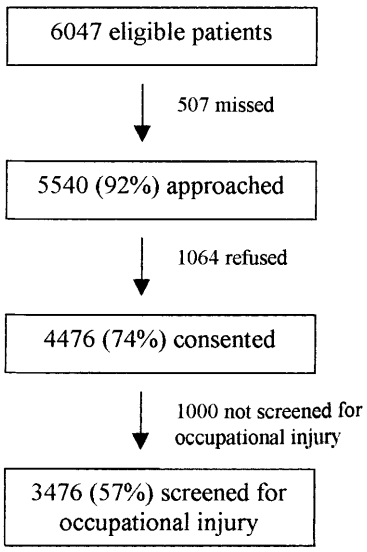

Figure 1. Flow diagram of patient entry into study.

research assistant unable to enroll patient due to ED staff presence (43.2%); research staff unable to locate patient (22.9%); research staff were too busy and could not approach all patients (15.4%); computer crash or other technical problem (8.9%); other (9.6%).

Among the 1,064 patients who refused enrollment in the study, the following reasons for refusal were recorded: patient indicated he or she was too sick/injured (18.2%); patient indicated he or she was too emotionally stressed (12.7%); patient in too much pain (19.1%); patient would not give reason (15.8%); patient stated the survey was too long (11.4%); patient was hostile to research (8.7%); other reason (14.1%). Most refusals occurred before the patient completed the consent form (90.1%). A few refusals occurred after the consent but before the computerized survey (3.6%) or during/after the computerized survey (5.3%). Institutional IRB issues prevented obtaining further information on patients who refused consent.

Because of time constraints, a hierarchical ordering of injury mechanisms was used for this study. Thus, for some injury mechanisms, participants were not asked if their injury occurred at work ($n = 998$). More specifically, the injury mechanisms of those not assessed for occupational injury were: motor-vehicle crash (77.5%), bicycle (8.9%), and intentional injury (13.4%). The mechanisms of injury in the two patients who did not respond to the occupational injury question were fall (0.1%) and undefined home injury (0.1%). Demographic characteristics of those not assessed for occupational injury were: mean age = 33.6 years (SD $\pm$ 12.5); 54.0% male; 77.0% white; 22.5% high school education or less, 38.2% college graduate, 39.2% at least some graduate school.

Among the 3,476 injured patients screened for occupational injury, 766 (22%) reported that their injury occurred at work. Demographic information and mechanism of injury for the two groups is shown in Table 1. The mean age of patients with occupational and nonoccupational injury was not significantly different ($p = 0.32$). Significantly more males presented with occupational injury (OR = 1.89, $p < 0.0001$). Race was similar in the two groups; most patients were white ($p = 0.71$). Although most patients in both groups had some education beyond high school, patients in the occupational injury group were significantly less likely than those with nonoccupational injury to have completed college or have graduate school education (OR = 0.39, $p < 0.0001$). Patients in the occupational injury group were five times more likely to be employed full-time (OR = 5.57, $p < 0.0001$).

Fall and cut or pierce were the two most common mechanisms of injury, accounting for more than 70% of injuries in both groups. Patients with occupational injury were significantly less likely to have fall as a mechanism of injury (OR = 0.44, $p < 0.0001$), and were significantly more likely to have cut or pierce

TABLE 1. Demographic Information and Mechanism of Injury for Patients Presenting to the ED with Occupational and Nonoccupational Injury

	Occupational Injury		Nonoccupational Injury	
	n	%	*n*	%
Total	766	22.0	2,710	78.0
Mean age (y, ±SD)	34.7 (14.5)		33.9 (11.6)	
Gender				
Male*	524	68.4	1,450	53.5
Female	242	31.6	1,260	46.5
Race				
White	635	82.9	2,231	82.3
African American	66	8.6	190	7.0
Hispanic	19	2.5	55	2.0
Other	45	5.9	228	8.4
Unknown	1	0.1	6	0.2
Years of schooling completed				
<12 years	61	8.0	98	3.6
High school graduate	503	65.7	1,322	48.8
College graduate*	117	15.3	540	19.9
Beyond college graduate	84	11.0	748	27.6
Unknown	1	0.1	2	0.1
Employment status				
Full-time	655	85.5	1,394	51.5
Part-time	89	11.6	497	18.3
Unemployed	14	1.8	791	29.2
Unknown	8	1.1	28	1.0
Mechanism of injury				
Fall*	234	30.6	1,351	49.9
Cut or pierce*	308	40.2	658	24.3
Burn*	48	6.3	63	2.3
Struck by object*	86	11.2	201	7.4
Other injury type	90	11.7	440	16.2
Drinking level†				
Not at risk	499	65.1	1,740	64.2
At risk	267	34.9	970	35.8

*Indicates significance at the $p < 0.05$ level.
†Indicates a TWEAK score ≥3, CAGE score ≥2, or exceeds NIAAA cut-off guidelines: for women of any age, more than seven drinks per week or three drinks per day; for men younger than age 65, more than 14 drinks per week or more than four drinks per day; for men older than 65, more than seven drinks per week or more than three drinks per day.

(OR = 2.11, $p < 0.0001$), burn (OR = 2.80, $p = 0.0001$), or struck by object (OR = 1.58, $p = 0.0007$) as a mechanism of injury compared with nonoccupational injury patients. Patients with occupational injury were as likely as patients with nonoccupational injury to be at-risk drinkers (OR = 0.96, $p = 0.68$, 95% confidence interval [CI] = 0.81 to 1.14). Similarly, there was no difference in the rate of at-risk drinking between the two groups when specific criteria for scoring positive for at-risk drinking (i.e., TWEAK, CAGE, NIAAA criteria[25]) were examined separately.

Demographic information and mechanism of injury for at-risk drinkers and non–at-risk drinkers with occupational injury is shown in Table 2. At-risk drinkers were significantly younger than non–at-risk drinkers ($p < 0.0001$). At-risk drinkers were significantly more likely than non–at-risk drinkers to be male (OR = 0.60, $p = 0.0028$), white (OR = 1.58, $p = 0.032$), and to not have completed college or have any graduate education (OR = 0.63, $p = 0.009$). At-risk drinkers were significantly more likely to have cut or pierce as a mechanism of injury (OR = 1.67, $p = 0.0008$), and significantly less likely to have fall (OR = 0.69, $p = 0.026$) as a mechanism of injury than non–at-risk drinkers.

Table 3 lists the location of injury and nature of injury among at-risk drinkers and non–at-risk drinkers presenting to the ED with occupational injury. The distribution of injury location in the two groups is similar. Approximately 50% of patients in both groups sustained an upper-extremity injury, and approximately 20% in both groups sustained a lower-extremity injury. Among patients with occupational injury, at-risk drinkers were significantly more likely than non–at-risk drinkers to have sustained a laceration (OR = 1.48, $p = 0.011$), consistent with their more common self-reported mechanism of cut or pierce.

DISCUSSION

To the best of our knowledge, this study is the first to examine self-reported alcohol use among patients presenting to the ED with occupational injury. There was no difference in the rates of at-risk drinking among patients presenting to the ED with

TABLE 2. Demographic Information and Mechanism of Injury for At-risk Drinkers and Non–At-risk Drinkers Presenting to the ED with Occupational Injury

	At-risk Drinkers		Non–At-risk Drinkers	
	n	%	*n*	%
Total	267	34.9	499	65.1
Mean age (y, ±SD)	29.1 (8.9)		36.0 (11.9)	
Gender				
Male*	201	75.3	323	64.7
Female	66	24.7	176	35.3
Race				
White*	232	86.9	403	80.8
African American	21	7.9	45	9.0
Hispanic	6	2.3	13	2.6
Other	8	3.0	37	7.4
Unknown	0	0.0	1	0.2
Years of schooling completed				
<12 years	18	6.7	43	8.6
High school graduate	194	72.7	309	61.9
College graduate*	38	14.2	79	15.8
Beyond college graduate	17	6.4	67	13.4
Unknown	0	0.0	1	0.2
Employment status				
Full-time	230	86.1	425	85.2
Part-time	33	12.3	56	11.2
Unemployed	2	0.8	12	2.4
Unknown	2	0.8	6	1.2
Mechanism of injury				
Fall*	68	25.5	166	33.3
Cut or pierce*	129	48.3	179	35.9
Burn	15	5.6	33	6.6
Struck by object	24	9.0	62	12.4
Other injury type	31	11.6	59	11.8

*Indicates significance at the $p < 0.05$ level.

occupational and nonoccupational injuries; more than 3 of 10 patients in both groups were at-risk drinkers.

In screening for those whose drinking placed them at increased risk of adverse health consequences, we took a conservative approach and chose to pool three different screening criteria. The TWEAK and CAGE questionnaires were chosen for the study because they have been shown to be sensitive tests in the ED population.[6] We added the NIAAA guidelines for quantity and frequency of alcohol use to our screening measures to maximize our sensitivity to detect those at risk for potential alcohol problems based on quantity and frequency of alcohol use alone. We chose to present unadjusted ORs based on injury type (occupational or nonoccupational), rather than adjusted ORs examining risk at an individual level. We believe that practicing emergency physicians will not adjust the estimated risk of at-risk drinking for each patient, but may recall the risk of at-risk drinking by injury type (occupational injury). Similarly, employers and other groups who might be interested in funding ED screening, intervention, or referral services will be interested in group estimates among patients with occupational injury.

Comparison of studies measuring the rates of alcohol problems among injured patients presenting to the ED is difficult, due to variations in screening methodologies and patient populations. Given these limitations, and the conservative definition of ''at-risk drinking'' used in this study in comparison to other studies, our findings are broadly consistent with results from other ED settings. For example, in a sample of ED populations from four community hospitals and three HMO-affiliated hospitals within a single county, 40% of injured patients were moderate drinkers and 19% were heavy drinkers in the community sample, and 29% were moderate drinkers and 13% were heavy drinkers in the HMO sample.[28] In a study of patients presenting to the University of Mississippi ED, Cherpitel found that among 356 injured patients, approximately 24% met *International Classification of Disease*, revision 10,[29] criteria for harmful drinking or alcohol dependence.[6] The definitions of harmful and dependent drinking in the later study are more stringent than the at-risk drinking criteria used in our study; this may account for the somewhat lower rates of alcohol problems in their patient population. Another study of 467 injured patients at a single inner-city hospital found that 16% of patients reported being drunk at least once a week, and 30% were at-risk drinkers by quantity criteria alone.[7]

Demographic markers of at-risk drinking among patients with occupational injury were similar to

TABLE 3. Location and Nature of Injury among At-risk Drinkers and Non–At-risk Drinkers Presenting to the ED with Occupational Injury

	At-risk Drinkers		Non-At-risk Drinkers	
	n	%	*n*	%
Body region				
Head and neck	22	8.3	58	11.5
Back and torso	17	6.4	33	6.5
Upper extremity	146	54.9	252	49.9
Lower extremity	56	20.7	100	19.8
Unspecified	29	9.8	61	12.3
Total	270	100.0	505	100.0
Nature of injury				
Laceration*	116	43.0	170	33.7
Contusion/abrasion	47	17.4	95	18.8
Sprain/strain	32	11.9	78	15.4
Fracture/dislocation	31	11.5	80	15.8
Burn	10	3.7	21	4.2
Amputation	7	2.6	9	1.8
Crush/degloving	1	0.4	2	0.4
Avulsion	1	0.4	8	1.6
Unspecified	25	9.2	42	8.3
Total	270	100.0	505	100.0

*Indicates significance at the $p < 0.05$ level.

findings from other studies, and included younger age,[7,28,30] male gender,[7,28,30] and less education.[13,14] If borne out in other studies, demographic characteristics of those patients with injury most likely to be at-risk drinkers may help to target those in whom screening is most cost-effective. Surprisingly, at-risk drinkers were more likely to have cut or pierce as a mechanism of injury than non–at-risk drinkers. It is unclear to what degree the increased risk of cut or pierce mechanism among those with at-risk drinking reflects patient vs. workplace safety characteristics.

Our sample was taken from a largely white population presenting to a single university hospital ED. However, the characteristics of the injured workers in our sample are similar in many ways to those of injured workers in two recent national samples. Jackson used data from the National Electronic Injury Surveillance System (NEISS) to characterize nonfatal occupational injuries treated in U.S. EDs in 1998.[2] Most patients were in the 20–40 age group, and about 70% were male, as in our sample. The three most common types of injuries in both the national sample and our sample involved lacerations, sprain/strain, and contusion/abrasion. Upper-extremity injures were by far the most common location of injury in both groups.

McCaig et al.[3] examined the characteristics of an estimated 4 million work-related injury visits to U.S. EDs using the 1995–1996 National Hospital Ambulatory Medical Care Survey. The characteristics of those with work-related injury were compared to those with non–work-related injury. Overall, males made up about 72% of work-related visits. Examination of first-listed external cause of injury demonstrated that, as in our sample, cut and struck by or striking against an object or person were significantly more common among those with work-related injury than non–work-related injury, and a significantly lower proportion of work-related injuries were for falls. Overall, the three most common documented work-related causes of injury matched those of our sample: cut, struck by, or striking against an object or person, and fall.

LIMITATIONS

Our study had a number of limitations. First, the generalizability of our findings is limited by the fact that our rate estimates were obtained by interviewing unintentionally injured workers presenting to a single ED. Second, the decreased response rate due to patients who refused, were not screened for occupational injury, and who were missed decreases the internal validity of the study. Patients with certain types of injury mechanisms were not screened for occupational injury, most notably those with injury from a motor-vehicle crash. Of the 998 patients in the sample who were not asked whether their injury occurred at work, 773 (78%) were injured in a motor-vehicle crash. However, whereas patients experiencing motor-vehicle collision make up the majority of excluded patients, national estimates suggest that this population of injured patients makes up only approximately 4% of those with occupational injury seen in the ED.[3] Similarly, patients who experienced intentional injury, including assault, also were not screened for occupational injury. However, data from the NEISS indicate that assaults account for only about 2% of all occupational injuries.[2] Another limitation is that the patient's work-injury status was determined based on patient self-reported response to a single question. However, chart review of occupational injury cases indicated explicit physician dictation reference to the injury being work-related in the vast majority of cases. Finally, due to IRB regulations, only limited information was able to be obtained regarding the characteristics of nonresponders. This reduced our ability to determine if responders and nonresponders differed in ways that might suggest bias in our results.

Further studies are needed to determine the rate of at-risk drinking among injured workers presenting to EDs in other settings. Such studies could confirm or refute the hypothesis that at-risk drinking is common among patients presenting to the ED with occupational injury. If further studies determine that at-risk drinking among such patients is common, then this would be an important population to target for alcohol intervention. Recent studies have shown that such interventions are acceptable to patients,[31] and are able to reduce alcohol-related negative health consequences.[11] ED interventions for injured workers might also include identification and referral to employer-based alcohol-intervention programs. By

increasing motivation to change, brief alcohol interventions provided in the ED might increase the likelihood of successful follow-up with and completion of such programs.

One might ask, if rates of at-risk drinking among injured patients in the ED are known to be high, why consider patients with occupational injury as a separate category, rather than focusing on the entire ED population? We believe that such an approach is valuable for two reasons. First, it is worthwhile to demonstrate that injured patients with potential alcohol problems in the ED are not, as might be imagined by some policy makers, all chronic, unemployed inebriates who live on the street. In fact, we found no difference in rates of at-risk drinking among those who were injured on the job and those who were injured elsewhere. Second, a barrier to implementing effective prevention strategies for patients with potential alcohol problems in the ED is that, even if proven effective, funding sources for preventive services may be difficult to obtain. If studies are able to demonstrate that such interventions are cost-effective for injured workers, either by increasing worker productivity (e.g., fewer sick days) or decreasing health care costs, employers may be willing to pay for such services. Instituting prevention efforts focused on certain populations of injured ED patients may be a necessary step in achieving the goal of providing effective preventive services to the entire population, and also might provide a means of funding services in the ED that could potentially be used by all ED patients.

CONCLUSIONS

A substantial percentage of nonfatal unintentional occupational injuries are treated in the ED. Approximately one third of such patients presenting to our ED are at-risk drinkers. This population may be an important group to target for alcohol screening and intervention.

References

1. Centers for Disease Control and Prevention. Surveillance for nonfatal occupational injuries treated in hospital emergency departments—United States, 1996. MMWR Morb Mortal Wkly Rep. 1998; 47:302–6.
2. Jackson LL. Non-fatal occupational injuries and illnesses treated in hospital emergency departments in the United States. Inj Prev. 2001; 7(suppl I):i21–26.
3. McCaig LF. National Hospital Ambulatory Medical Care Survey: 1998 Emergency Department Summary. Advance data from vital and health statistics; No 313. Hyattsville, MD: National Center for Health Statistics, 2000.
4. Dinh-Zarr T, Diguiseppi C, Heitman E, Roberts I. Preventing injuries through interventions for problem drinking: a systematic review of randomized controlled trials. Alcohol. 1999; 34:609–21.
5. Walsh DC, Hingson RW, Merrigan DM, Levenson SM, Coffman GA, Heeren T, et al. The impact of a physician's warning on recovery after alcoholism treatment. JAMA. 1992; 267:663–7.
6. Cherpitel CJ. Screening for alcohol problems in the emergency department. Ann Emerg Med. 1995; 26:158–166.
7. Cherpitel CJ. Drinking patterns and problems: a comparison of ER patients in an HMO and in the general population. Alcohol Clin Exp Res. 1992; 16:1104–9.
8. Grumback K, Keane D, Bindman A. Primary care and public emergency department overcrowding. Am J Public Health. 1993; 83:372–8.
9. Pane GA, Farner MC, Salness KA. Health care access problems of medically indigent emergency department walk-in patients. Ann Emerg Med. 1991; 20:730–3.
10. Minugh PA, Nirenberg TD, Clifford PR, Longabaugh R, Becker BM, Wollard R. Analysis of alcohol use clusters among subcritically injured emergency department patients. Acad Emerg Med. 1997; 4:1059–67.
11. Longabaugh R, Woolard RE, Nirenberg TD, et al. Evaluating the effects of a brief motivational intervention for injured drinkers in the emergency department. J Stud Alcohol. 2001; 62:806–16.
12. Observer MA, Maxwell Q. A study of absenteeism, accidents and sickness payments in problem drinkers in one industry. J Stud Alcohol. 1959; 20:302–12.
13. Hingston RW, Lederman RI, Walsh DC. Employee drinking patterns and accidental injury: a study of four New England states. J Stud Alcohol. 1985; 46:298–303.
14. Webb GR, Redman S, Hennrikus DJ, Kelman GR, Gibberd RW, Sanson-Fisher RW. The relationships between high-risk and problem drinking and the occurrence of work injuries and related absences. J Stud Alcohol. 1994; 55:434–46.
15. Mangione TW, Howland J, Amick B, Cote J, Lee M, Bell N, Levine S. Employee drinking practices and work performance. J Stud Alcohol. 1999; 60:261–70.
16. Blose JO, Holder HD.Injury-related medical care utilization in a problem drinking population. Am J Public Health. 1991; 81:1571–5.
17. Holder HD, Blose JO. A comparison of occupational and nonoccupational disability payments and work absences for alcoholics and nonalcoholics. J Occup Med. 1991; 33:453–7.
18. Walsh DC, Hingson RW, Merrigan DM, A randomized trial of treatment options for alcohol-abusing workers. N Engl J Med. 1991; 325:775–82.
19. Holder HD, Blose JO. The reduction in health care costs associated with alcoholism treatment: a 14-year longitudinal study. J Stud Alcohol. 1992; 53:293–302.
20. Maio RF, Waller PF, Blow FC, Hill EM, Singer KM. Alcohol abuse/dependence in motor vehicle crash victims presenting to the emergency department. Acad Emerg Med. 1997; 4:256–62.
21. Ewing JA. Detecting alcoholism: the CAGE questionnaire. JAMA. 1984; 252:1905–7.
22. Russell M, Martier SS, Sokol RJ, Mudar P, Bottoms S, Jacobson S, Jacobson J. Screening for pregnancy risk—drinking. Alcohol Clin Exp Res. 1994; 18:1156–61.
23. Saunders JB, Aasland OG, Babor TF, de la Fuente JR, Grant M. Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO Collaborative Project on Early Detection of Persons with Harmful Alcohol Consumption—II. Addiction. 1993; 88:791–804.
24. Cherpitel CJ. A brief screening instrument for problem drinking in the emergency room: the RAPS4. Rapid Alcohol Problems Screen. J Stud Alcohol. 2000; 61:447–9.
25. National Institute on Alcohol Abuse and Alcoholism. The Physician's Guide to Helping Patients with Alcohol Problems. U.S. DHHS NIH Publ. No 95-3769. Washington, DC: PHS, 1995.
26. World Health Organization. Manual of the International Statistical Classification of Diseases, Injuries, and Causes of

Death. 9th revision. Geneva, Switzerland: World Health Organization, 1977.
27. Folstein MF, Folstein SE, McHugh PR. Mini-mental state: a practical method for grading the cognitive state of patients for the clinician. J Psychiatr Res. 1975; 12:189–98.
28. Cherpitel CJ. Alcohol consumption among emergency room patients: comparison of county/community hospitals and an HMO. J Stud Alcohol. 1993; 54:432–40.
29. World Health Organization. Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death. 10th revision. Geneva, Switzerland: World Health Organization, 1992.
30. Cherpitel CJ. Alcohol and injuries: a review of international emergency room studies. Addiction. 1993; 88: 651–65.
31. Hungerford DW, Pollock DA, Todd KH. Acceptability of emergency department-based screening and brief intervention for alcohol problems. Acad Emerg Med. 2000; 7:1383–92.