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Alcohol Abuse and Illegal Drug Use among Los Angeles County Trauma Patients: Prevalence and Evaluation of Single Item Screener

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Abstract

Background—The misuse of alcohol and illicit drugs is implicated with injury and repeat injury. Admission to a trauma center provides an opportunity to identify patients with substance use problems and initiate intervention and prevention strategies. To facilitate the identification of trauma patients with substance use problems, we studied alcohol abuse and illegal substance use patterns in a large cohort of urban trauma patients, identified correlates of alcohol abuse, and assessed the utility of a single item binge-drinking screener for identifying patients with past 12-month substance use problems.

Methods—Between February 2004 and August 2006, 677 patients from four large trauma centers in Los Angeles (LA) County were interviewed. The sample was broadly representative of the entire LA County trauma center patient population.

Results—24% of patients met criteria for alcohol abuse and 15% reported using an illegal drug other than marijuana in the past 12-months. Male gender, assaultive injury, peritrauma substance use, and history of binge drinking were prominent risk factors. A single-item binge drinking screen correctly identified alcohol abuse status in 76% of all patients; the screen also performed moderately well in discriminating between those who had or had not used illegal drugs in the past 12-months, with sensitivity estimates reaching 0.79 and specificity estimates reaching 0.74.

Conclusions—A large proportion of urban trauma patients abuse alcohol and use illegal drugs. Distinct sociodemographic and substance use history may indicate underlying risky behaviors. Interventions and injury prevention programs need to address these causal behaviors to reduce injury morbidity and recidivism. In the busy trauma care setting, a one-item screener could be helpful in identifying patients who would benefit from more thorough assessment and possible brief intervention.

Introduction

Substance use is commonly associated with physical injury, and prior research confirms that a sizable proportion of individuals receiving treatment at trauma centers exhibit a pattern of harmful substance-using behaviors. For example, among a sample of 1,118 adult patients admitted to the University of Maryland Shock Trauma Center (Shock Trauma) in Baltimore, Maryland between 1994 and 1996 (1–4), 44% met lifetime criteria for alcohol abuse or dependence and 32% met criteria for current alcohol abuse or dependence when assessed with a structured clinical interview (4). High levels of alcohol use disorders are seen among trauma patients in other settings (5) and are prevalent even among young adult trauma center patients who are not legally old enough to drink alcohol (6). Limited research also indicates that illegal drug use among trauma patients is also somewhat common: among patients in Shock Trauma, forty-five percent were lifetime users of illegal drugs, primarily marijuana (37%), cocaine (23%), and opiates (18%)(1). In bivariate analyses, those factors most strongly associated with current alcohol abuse/dependence were being male, unmarried and older; correlates of lifetime drug use were younger age, being unmarried, lower income, and male sex (1). While these data are informative, studies of trauma patients in other areas of the United States are needed, for example, to capture variability in drug and alcohol use, as well as variations in other patient characteristics (7).

Public health and safety officials have proposed that trauma centers capitalize on the “teachable moment” of an injury by implementing Screening and Brief Intervention (SBI) to identify and help persons with alcohol use problems, ranging from heavy drinking to alcohol use disorders (alcohol abuse and alcohol dependence) (8). SBI generally entails screening patients for problem alcohol use and alcohol use disorders and conducting a brief intervention as needed with appropriate referral (8). In 2007, the American College of Surgeons (ACS) required that trauma centers have in place a screening program to identify alcohol problems in order to be accredited as a Level I trauma center (9). However, best practices for how to meet this requirement have not yet been established.

Despite the wide endorsement of screening and triage of underlying alcohol use behaviors, actual implementation is hampered by several barriers. The time constraints of the trauma care setting minimize the likelihood that the surgeons may conduct SBI for all patients (10,11). SBI may not be viewed by trauma center staff as the core purpose of the center (12), even though interventions in this setting have been shown to reduce injury recurrence (13). Although the ACS screening requirements focus only on problem alcohol use and alcohol

use disorders, some have proposed screening for illegal drug use and associated disorders as well (1) — such questions, however, are sensitive, and trauma center staff may feel that this line of questioning is intrusive and detracts from the process of providing care for the physical injury (10,12).

Thus, identifying minimally burdensome approaches to screening is important. One way to address these issues is to screen only those patients at high risk of engaging in problem drinking, illegal drug use, or of having an alcohol use disorder. However, absent standardized screening tools, trauma center staff has been shown to do poorly in identifying such patients when relying on clinical judgment alone (14). Although numerous, validated multiple-item screening instruments for alcohol and substance use and associated disorders exist, (8), even relatively short surveys can be burdensome to administer and may cause discomfort among staff members. One interesting line of research points to the potential utility of using a single question about binge drinking as a triage tool (15–17). To date, this approach has been studied in a small number of emergency departments and in a relatively small sample of patients in one trauma center.

The majority of research on SBI in trauma centers has focused on alcohol use disorders and not on other drug use, though injuries may also provide an opportunity to reach out to persons who use other psychoactive substances (18). Relative to alcohol use, use of other psychoactive substances in the general population is rare (19) and trauma centers provide a potentially important point of contact for identifying persons in the population who use illegal drugs but may not receive other types of medical care (20,21).

The current study has three aims: (1) to examine the prevalence of alcohol abuse and illegal drug use among trauma center patients in Los Angeles county; (2) to identify sociodemographic factors and injury characteristics that correlate with alcohol abuse in these patients; and (3) to assess the utility of a single item screener for identifying patients with probable alcohol abuse and who used illegal drugs in the past 12 months. We conduct this analysis among a sample of trauma patients weighted to be representative of all persons treated in trauma centers in Los Angeles County.

Materials and Methods

Sample

The sample was recruited between February 2004 and August 2006 from four trauma centers in Los Angeles County: Los Angeles County + University of Southern California Medical Center (LAC+USC), UCLA Medical Center, King-Drew Medical Center, and California Hospital Medical Center. Interviewers attempted to screen and consent all eligible patients at each hospital on those days when interviewers were at the hospital. At each hospital, interviews could occur on any day of the week. Different methods for identifying eligible individuals were used at the four hospitals due to different types of medical records and the IRB approved protocols. At LAC+USC, interviewers had direct access to computerized admission records. These records were used to identify all admitted patients who were over 18 years of age, not incarcerated, and whose injuries met three criteria: (a) they required a surgical intervention, (b) were not restricted to their extremities, and (c) were caused by a penetrating or blunt trauma. We only approached every other Hispanic patient at LAC+USC in order to adjust for the overrepresentation of Hispanics at this trauma center relative to others in LA County. Interview staff did not have direct access to a census of admissions at the other three hospitals. At those locations trauma nurses identified patients who met those screening criteria and notified research staff. Patients who met the age, incarceration, and trauma injury criteria (N=1133) were then screened in a face-to-face interview to assess additional eligibility criteria. Of those screened, 10.3% were excluded

because they were unable to converse in either English or Spanish, 10.0% because they were homeless and could not give contact information for a follow up interview, 2.4% because the injuries were due to an attempted suicide, 1.4% because the injuries were caused by domestic violence, and 0.9% because they had a cognitive impairment that prevented informed consent or understanding the interview. Interviewers successfully screened 89% of patients attempted. Of the 850 patients identified as eligible, 677 (80%) completed the baseline interview. Of the 677 who completed an initial interview, 476 (70%) completed 6-month follow-up interviews and 462 (68%) completed 12-month follow-up.

Case-mix adjustment

The Los Angeles County Trauma and Emergency Medicine Information System (TEMIS) collects patient-level data on all trauma patients treated at the 13 participating trauma centers. Our study cohort was very similar to the profile of the 2005 TEMIS population with respect to age, race, gender, and whether the injury was an assault, although the TEMIS population had slightly less severe injuries. To adjust for any case-mix differences, we created post-stratification weights by matching our sample to the TEMIS population in 36 categories: sex (2 levels) $\times$ Ethnicity (Hispanic, Black, White/Other) $\times$ Injury Mechanism (Assault, Other) as well as by injury severity score (22). After weighting, our sample closely matched the TEMIS population, even with respect to injury severity (Table 1). All subsequent analyses were conducted using the post-stratification weights to provide estimates representative of the general Los Angeles County trauma population.

Measures

Alcohol Abuse—The presence of alcohol abuse in the past 12 months was assessed using the Composite International Diagnostic Interview (CIDI) schedule. The CIDI has been shown to possess validity for identifying individuals meeting DSM-IV diagnostic criteria (23). Persons were identified as meeting abuse criteria if they endorsed any of four criteria: (1) recurrent alcohol use that results in failure to fulfill major role obligations at work, school, or home; (2) recurrent alcohol use in situations that are physically hazardous; (3) recurrent alcohol-related legal problems; and (4) continued alcohol use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of the alcohol. In the CIDI, endorsing any of the four abuse items prompts a screen for alcohol dependence; however, due to concerns about respondent burden, the current study did not include questions to differentiate alcohol abuse from dependence.

Peritrauma substance use—Peritrauma alcohol or other drug use was assessed with a single question: *Now think about the 2-hour period immediately before you were injured. Did you have any alcohol to drink or did you take any drugs during those 2 hours?* Self-report of peritrauma alcohol and other drug use is valid in this context and may even be more reliable than toxicology screens, which are dependent on the amount of time between an injury and a visit to the trauma center (24).

Binge drinking—Binge drinking was assessed with a question that asked: *During the 30 days before your injury, how many times did you have 5 or more drinks on one occasion?* (“4 or more drinks” for females).

Other drug use—Other drug use was assessed with a series of questions that asked about use of specific substances (e.g., marijuana, cocaine, hallucinogen, ecstasy, opium or heroin, and prescription drugs in some way not prescribed by a doctor) in the past 12 months.

Other measures—Sociodemographic information (gender, race, age, type of injury, health insurance status) was obtained by self-report. Injury severity was indexed by Injury

Severity Scores (25) obtained from medical records. For analytic purposes, we distinguished assaults from all other injuries. Assaults were defined as injuries resulting from being shot with a gun, being stabbed with a knife or another sharp object, getting hit with an object like a bat or a metal bar, or getting kicked, hit, or punched by someone; the other category is comprised primarily injuries resulting from motor vehicle “accidents” and falls.

Analysis

As an initial step, we examined descriptive statistics for the sample. We subsequently estimated bivariate associations between patient characteristics (sex, race, age, health insurance status), injury characteristics (injury severity, assault/other), and substance-using behaviors (peritrauma substance use, 30-day binge drinking, 12-month illegal drug use) with the presence of 12-month alcohol abuse. Next, we built a multivariate model in which patient characteristics, injury characteristics, and substance-using behaviors were used to predict whether respondents meet CIDI criteria for alcohol abuse.

Our final analytic strategy was to examine the utility of the single binge drinking item as a screener for CIDI criteria of alcohol abuse and 12-month drug use. We used measures of validity and reliability (i.e., sensitivity, specificity, efficiency, positive predictive value (PPV) and negative predictive value (NPV)) to assess the utility of the binge drinking screen for each outcome. *Sensitivity* identifies the proportion of patients *with* alcohol abuse or 12-month drug use correctly identified by the binge drinking screener. *Specificity* identifies the proportion *without* alcohol abuse or 12-month drug use identified as such by binge drinking screener. *Efficiency* refers to the proportion correctly identified by test. The other two measures, PPV and NPV, identify the proportion of those who screen positive for binge drinking with alcohol abuse or 12-month drug use, and the proportion of those who screen negative for binge drinking without alcohol abuse or 12-month drug use, respectively. PPV and NPV vary based on the prevalence of the outcome in the population, though may be of particular interest to trauma center staff in Los Angeles. For these providers, PPV and NPV provide an indication of the percentage of those who screen positively or negatively who actually have or do not have the outcome of interest.

Results

Descriptive statistics of the analytic sample (N = 677) are presented in Table 1 (demographics and injury characteristics) and Table 2 (health insurance status and substance use). The majority of trauma patients were male and predominantly Hispanic. Nearly one-third of the injuries were assaults; the mean injury severity score was 8.7 which is considered to be of mild severity (22). Approximately one-quarter of the sample met criteria for alcohol abuse in the past year. Thirty-seven percent of patients reported using marijuana and 12.1% reported using cocaine in the past 12-months. Use of other drugs, including a category of other drugs that included amphetamine, sedatives, or inhalants, and prescription drugs was close to 5%, and reports of hallucinogens, ecstasy, and opiate use in the past 12-months were each around 2%. When illegal drug categories were combined, 14.9% of patients reported illegal drug use other than marijuana in the past 12-months.

In bivariate analyses, the characteristics associated with meeting criteria for alcohol abuse in the past year were male gender, having been victim of an assault, peritrauma substance use, binge drinking in the previous 30 days, and all 12-month drug use variables (Table 3). When the drug-use variables were collapsed into marijuana use only and other drug use, both categories remained associated with alcohol abuse. After adjusting for covariates (i.e., sex, race, age, health insurance status, injury severity, assault/other, peritrauma substance use, binge drinking, and any 12-month illegal drug use other than marijuana) in the multivariate analysis, the following variables remained significant and unique predictors of alcohol

abuse: peritrauma substance use, binge drinking in the previous 30 days, and any use of drugs other than marijuana in the previous 12 months.

Evidence of the utility of the binge drinking screen for identifying those with past year alcohol abuse and past year illegal drug use is presented in Table 4. The screen correctly identified 79% of those with and 75% of those without alcohol abuse. In this population, 49% of those who screened positive actually met criteria for alcohol abuse (PPV=0.49). Of those who screened negative, only 8% met criteria for alcohol abuse (NPV=0.92).

The binge item screen did less well in identifying those who reported illegal drug use in the past 12-months. Sensitivity estimates ranged from a high of 0.79 for ecstasy and 0.76 for hallucinogens to a low of 0.47 for “other” drug use (which includes amphetamines, sedatives, and/or inhalants). Specificity of the binge item screen for 12-month marijuana use was 0.74, while for all other drugs specificity estimates ranged from 0.63 to 0.67. Of those who screened positive for binge drinking, only 56% reported using marijuana (PPV=0.56) and fewer reported using cocaine (PPV=0.22); reports of other drug use among those who screened positive were low (PPV estimates range from 0.03 for opium to 0.08 for other drugs). Of those who screened negative, 25% reported marijuana use in the past 12-months (NPV=0.25), and between 1% to 6% of those who screened negative for binge drinking reported any other drug use (NPV estimates range from 0.94 for cocaine to 0.99 for both hallucinogens and ecstasy).

Discussion

This study of individuals who received service from the Los Angeles County trauma system had three objectives: (1) to examine the prevalence of alcohol abuse and illegal substance use among trauma center patients in Los Angeles county; (2) to identify sociodemographic factors and injury characteristics that correlate with alcohol abuse in these patients; and (3) to assess the utility of a single item screener for identifying patients with probable alcohol abuse and who used illegal drugs in the past 12 months.

We found that a large proportion, approximately one-quarter, of trauma patients in Los Angeles County met the criteria for alcohol abuse in the 12 months preceding their injury. Furthermore, 37% reported past 12-month marijuana use and 15% reported use of drugs other than marijuana. After marijuana, cocaine was the most commonly used illegal drug (12%). When compared to the results from a general population survey (25) indicating that 4.4% of adults in the U.S. meet CIDI-criteria for alcohol abuse in the past 12-months, our study highlights the disproportionate prevalence of alcohol abuse among trauma center patients. A similar 2002–2004 survey on drug use among persons 12 and older in the Los Angeles area reported that the prevalence of past-year marijuana use was 10%, and that past year cocaine use was 2% (7). Our findings suggest that the patients seen in trauma centers in LA are at significantly elevated risk for drug use. The high proportion of individuals with alcohol use disorders and who report illegal drug use in the past 12 months in our representative sample substantiates the American College of Surgeons recommendation for incorporating alcohol and substance use screening and brief interventions into trauma care. Although reflective of the local context, we believe that our estimates of alcohol and substance abuse in trauma patients are generalizable to other urban centers and can be used to inform policy and shape planning efforts that aim to use trauma centers to identify persons with substance use problems with the ultimate goal of reducing repeat injury.

For our second aim, we found strong bivariate relationships between alcohol abuse and other substance using behaviors, including peritrauma substance use, binge drinking in the previous 30 days, and all 12-month drug use variables. In addition, male gender and having

an assaultive injury were also linked with alcohol abuse. In a multivariate model that accounted for sociodemographics, characteristics of the injury and substance using behaviors simultaneously, only substance-using behaviors (peritrauma substance use, binge drinking, and 12-month drug use) remained linked with alcohol abuse. Thus, once these factors are taken into account, it appears that injury characteristics and sociodemographic information are not predictive of substance use, suggesting the importance again of screening broadly rather than based on observable characteristics.

Our third goal was to examine the feasibility of using a single item screener to identify individuals who may need additional assessment for substance use problems. Our results indicate that the binge item screen correctly identifies the alcohol abuse status of nearly three-quarters of all patients, and that the screen performs comparably with respect to identifying those with and without alcohol abuse. Depending on the illicit drug used, the binge item screen identifies between half and three quarters of patients who used drugs in the past 12-months, with the strongest sensitivity estimates for hallucinogens and ecstasy. For identifying patients who did not use illegal drugs in the past 12-months, for some drugs (marijuana, opium, prescription drugs, and “other” drugs) the screen performs better than it did in identifying users, for some drugs (hallucinogens, ecstasy) it performs worse, and for cocaine the screen performs equally well at identifying users and non-users. Thus, our results indicate that a single item alcohol screener may be useful for identifying past year users of other illegal drugs so that further screening and potential intervention can be directed toward these individuals, though in using this screen some past-year drug users individuals will surely be missed. Previous studies have demonstrated the utility of a binge item screen among patients presenting at an emergency room within 48 hours of suffering an acute injury (15,17) and among a relatively small number of trauma center patients (16). Our findings corroborate the results of studies conducted in other settings (i.e., emergency departments) suggesting that a single item screener is useful for identifying patients who might benefit from more extensive assessments to discern hazardous drinking behaviors, symptoms of alcohol abuse, or illegal drug use, which could potentially reduce the risk injury recurrence among those with substance use problems (13).

Limitations/directions for future research

These results should be considered in light of certain study limitations. Our measure of alcohol abuse does not allow us to differentiate alcohol dependence from abuse. Thus, an unknown number of individuals who meet criteria for alcohol abuse may also qualify for the more stringent diagnosis of alcohol dependency. In practice, this inability to differentiate between abuse and dependence may have little significance inasmuch as the process of identification and triage is the same for either group. In addition, we focus on illegal substance use rather than abuse or dependence. Inasmuch as drug use and abuse in trauma center populations is understudied, future research should investigate the utility of screening for drug abuse in this setting. Finally, although our study results are applicable to the network of trauma centers in Los Angeles, the most populous and ethnically diverse county in the United States, they may not be readily generalizable to trauma centers in rural settings. Substance use varies across regions of the U.S. (7,26), and future research should examine geographic variation in substance use and associated disorders in trauma centers as well as the practicality of screening for substance use and abuse in trauma centers in these regions.

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Table 1

Trauma Center Patient Characteristics

	LA County		Current Study	
	N	%	N	Weighted %
TOTAL	677	100.0		100.0
Age				
<25	3614	27.1	199	29.4
25–37	4258	32.0	246	36.3
38+	5456	40.9	232	34.3
Sex				
Male	10381	77.9	525	77.5
Female	2947	22.1	152	22.5
Race/Ethnicity				
Latino	6477	48.6	330	48.7
Black	2524	18.9	171	25.3
White/Other	4327	32.5	176	26.0
Injury Mechanism				
Assault [†]	4275	32.1	246	36.3
Other	9053	67.9	431	63.7
Injury Severity				
<5	5035	37.8	191	28.2
5–9	3787	28.4	215	31.8
10+	4506	33.8	271	40.0

LA County estimates derived from the 2005 Los Angeles County Trauma and Emergency Medicine Information System (TEMIS). For these estimates, TEMIS data was restricted to patients between the ages of 18 and 70 and excluded those with missing data on injury severity or race/ethnicity, or if race/ethnicity was coded as 'unknown.'

[†] Does not include self-inflicted injuries.

Table 2

Health Insurance Status and Substance Use among LA Trauma Center Patients

	<u>N</u>	<u>%</u>
TOTAL	677	100.0
Health Insurance	282	41.2
Alcohol-Using Behaviors*		
Alcohol Abuse (12-month)//	163	23.5
Peritraumatic Substance Use [†]	212	30.0
Binge Drinking (30-day)	258	37.4
12-Month Drug Use*		
Marijuana	269	36.6
Crack/Cocaine Use	87	12.1
Hallucinogen Use	17	2.1
Ecstasy Use	18	2.2
Heroin Use	14	2.4
Other Drug Use	43	6.1
Prescription Drug Use	34	5.0
Collapsed 12-Month Drug Use Categories		
No Drug Use	373	57.8
Marijuana Only	196	27.3
Hard drug use	108	14.9

Analyses are weighted to represent all LA County trauma center patients

* Response options are not mutually exclusive

// Positive endorsement of 1 of 4 DSM-IV symptoms of alcohol abuse, from CIDI

[†] Any alcohol or drug use 2 hours immediately before being injured

Table 3Bivariate and Multivariate Associations with Past 12-Month Alcohol Abuse^{//}

	Bivariate		Multivariate	
	<u>OR</u>	<u>95% CI</u>	<u>aOR</u>	<u>95% CI</u>
Sex				
Male (Ref)				
Female	0.5	(0.3, 0.8)	0.8	(0.4, 1.5)
Race/Ethnicity				
Latino/Hispanic (Ref)				
White	0.8	(0.5, 1.3)	0.8	(0.4, 1.5)
Black/AA	0.8	(0.5, 1.2)	0.9	(0.5, 1.6)
Other	0.5	(0.2, 1.2)	0.6	(0.2, 2.1)
Age (Continuous)	0.8	(0.7, 1.0)	1.0	(1.0, 1.0)
Health Insurance**	0.7	(0.5, 1.0)	0.9	(0.6, 1.5)
Injury Severity (Continuous)	1.0	(0.9, 1.3)	1.0	(1.0, 1.0)
Injury Mechanism				
Other				
Assault [¶]	1.6	(1.1, 2.4)	0.7	(0.4, 1.1)
Alcohol-Using Behaviors*				
Peritraumatic Substance Use [‡]	6.8	(4.5, 10.2)	3.8	(2.3, 6.2)
Binge Drinking (30-day)	11.2	(7.0, 17.7)	6.5	(3.9, 10.8)
12-Month Drug Use*				
Marijuana	2.8	(1.9, 4.1)		
Crack/Cocaine Use	3.3	(2.0, 5.5)		
Hallucinogen Use	3.8	(1.4, 10.7)		
Ecstasy Use	3.7	(1.3, 10.7)		
Heroin Use	6.5	(1.9, 22.0)		
Other Drug Use	2.8	(1.4, 5.4)		
Prescription Drug Use [§]	4.0	(1.9, 8.2)		
Collapsed 12-Month Drug Use Categories				
No Drug Use (Ref)				
Marijuana Only	2.8	(1.8, 4.5)	1.8	(1.0, 3.0)
Hard drug use [±]	5.7	(3.4, 9.6)	2.7	(1.4, 5.2)

Analyses are weighted to represent all LA County trauma center patients

Abbreviations: OR=Odds Ratio; aOR=Adjusted Odds Ratio; 95% CI=95% Confidence Interval

^{//} Positive endorsement of 1 of 4 DSM-IV symptoms of alcohol abuse, from CIDI^{**} Twelve cases who responded "don't know" were excluded; when these responses were changed to "no", there were no qualitative differences.[¶] Does not include suicide attempts or cases of domestic violence^{*} Response options are not mutually exclusive

[†]Any alcohol or drug use 2 hours immediately before being injured

[§]Use of prescription drugs or pain killers in a way not prescribed by a doctor

[±]Use of either crack/cocaine, hallucinogen, ecstasy, heroin, other drugs not specified, or prescription drugs or pain killers in a way not prescribed by a doctor

Table 4

Binge Drinking, Alcohol Abuse, and Other Drug Use.

	<u>Sensitivity</u>	<u>Specificity</u>	<u>Efficiency</u>	<u>PPV</u> [*]	<u>NPV</u> ^{**}
Alcohol Abuse//	0.79	0.75	0.76	0.49	0.92
12-Month Use of					
Marijuana	0.57	0.74	0.68	0.56	0.75
Crack/Cocaine	0.67	0.67	0.67	0.22	0.94
Hallucinogen	0.76	0.63	0.64	0.04	0.99
Ecstasy	0.79	0.64	0.64	0.05	0.99
Heroin	0.53	0.63	0.63	0.03	0.98
Other Drug	0.47	0.63	0.62	0.08	0.95
Prescription Drug [§]	0.53	0.63	0.63	0.07	0.96

// Positive endorsement of 1 of 4 DSM-IV symptoms of alcohol abuse, from CIDI.

[§] Use of prescription drugs or pain killers in a way not prescribed by a doctor

Sensitivity: Proportion with alcohol abuse/current drug use correctly identified by binge drinking screener (True Positives/True Positives + False Negatives)

Specificity: Proportion without alcohol abuse/current drug use identified as such by binge drinking screener (True Negatives/True Negatives + False Positives)

Efficiency: Proportion correctly identified by test (True Positives + True Negatives/Total Population)

*** PPV (Positive Predictive Value):** Proportion of those with alcohol abuse/current drug use who screen positive for binge drinking (True Positives/True Positives + False Positives); results vary based on prevalence of disease in population

**** NPV (Negative Predictive Value):** Proportion of those without alcohol abuse/current drug use who screen negative for binge drinking (True Negatives/True Negatives + False Negatives); results vary based on prevalence of disease in population.