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Nationwide Survey of Alcohol Screening and Brief Intervention Practices at US Level I Trauma Centers

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Abstract

BACKGROUND—In 2007, the American College of Surgeons (ACS) Committee on Trauma implemented a requirement that Level I trauma centers must have a mechanism to identify patients who are problem drinkers and the capacity to provide an intervention for patients who screen positive. Although the landmark alcohol screening and brief intervention (SBI) mandate is anticipated to impact trauma practice nationwide, a literature review revealed no studies that have systematically documented SBI practice pre-ACS requirement.

STUDY DESIGN—Trauma programs at all US Level I trauma centers were contacted and asked to complete a survey about pre-ACS requirement trauma center SBI practice.

RESULTS—One hundred forty-eight of 204 (73%) Level I trauma centers responded to the survey. More than 70% of responding centers routinely used laboratory tests (eg, blood alcohol concentration) to screen patients for alcohol and 39% routinely used a screening question or standardized screening instrument. Screen-positive patients received a formal alcohol consult or had an informal alcohol discussion with staff members approximately 25% of the time.

CONCLUSIONS—The investigation observed marked variability across Level I centers in the percentage of patients screened and in the nature and extent of intervention delivery in screen-positive patients. In the wake of the ACS Committee on Trauma requirement, future research could systematically implement and evaluate training in the delivery of evidence-based alcohol interventions and training in development of trauma center organizational capacity for sustained delivery of SBI.

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Each year in the US, approximately 2.5 million individuals are so severely injured that they require inpatient hospital admission.¹ Epidemiologic investigations have documented that alcohol-use disorders are endemic among trauma center inpatients.²⁻⁹ A body of evidence now supports the effectiveness of alcohol screening and brief intervention (SBI) programs that use motivational interviewing techniques in acute care medical and surgical settings.^{2,10-24} Cost-to-benefit analyses suggest that widespread SBI implementation using motivational interviewing could result in substantial health-care cost savings.²⁵⁻²⁷ Integration of SBI into acute injury care has the potential to markedly increase the number of patients who receive needed services and has been a longstanding public health objective.

In January 2005, the American College of Surgeons Committee on Trauma (ACS/COT), the primary agency responsible for developing trauma center requirements, passed a resolution requiring that ACS-verified Level I trauma centers must have a mechanism to screen injured patients for an alcohol-use disorder and to provide an intervention to those who screen positive.²⁸ This mandate went into effect in the spring of 2007 and represents the first nationwide alcohol SBI mandate in a general medical setting (ie, hospital inpatient, emergency department, or primary care outpatient setting). Although the ACS/COT requirement represents a landmark policy decision, a number of questions about baseline SBI practices and future SBI implementation remain. It is important to assess pre-mandate baseline practices to identify institutional needs for implementation of routine SBI at Level I trauma centers.

A series of earlier surveys have documented barriers at the individual provider level to alcohol SBI. Danielsson and colleagues surveyed SBI practices among a random sample of 241 members of the American Association for the Surgery of Trauma and found that > 50% of surgeons screened < 25% of their patients for alcohol.²⁹ Four years later, Schermer and colleagues conducted an alcohol SBI practices survey among 383 surgeons and noted an increase in screenings, as two-thirds of respondents reported routinely checking blood alcohol concentration (BAC).³⁰

In contrast to these surveys of individual trauma surgeons, the ACS/COT mandate can be seen to impact alcohol SBI practices at the institutional level or population of Level I trauma center sites nationwide in the US.³¹ Literature review revealed few systematic surveys of trauma center SBI practices at the institutional level. Soderstrom and colleagues³² reported that in the early 1990s, 72% of Level I trauma centers surveyed had a policy to routinely measure admission BACs. Of note, the American Trauma Society's Trauma Information Exchange Program³³ survey provides information on trauma center institutional characteristics, such as region of the country; rural or urban status; hospital bed number; and teaching hospital status; but it does not contain information about alcohol SBI procedures.

A key investigative issue is identifying factors that govern the successful implementation and development of sustainable, high-quality SBI delivery at the trauma center organizational level. The overarching goal of the current investigation was to survey pre-ACS mandate alcohol SBI practices nationwide for all US Level I trauma centers. The investigation aimed to document SBI screening procedures at Level I trauma centers (eg, BAC, screening questionnaire) before the mandate went into effect. The investigation also aimed to assess the nature and extent of pre-ACS mandate trauma center-based alcohol intervention activity. A major question of interest was the extent to which trauma center organizational-level characteristics predicted current alcohol SBI practices.

METHODS

Identification and characterization of US Level I trauma centers

All Level I trauma centers in the US were identified through review of the ACS listing of verified trauma programs, the American Trauma Society's Information Exchange information system, and other Web-based searches.³³ Informational data on hospital accreditation, academic affiliation, and bed number were obtained from American Hospital Directory listings and through review of individual hospital Web pages.

These public information data sources were used in conjunction with hospital Web sites to identify potential trauma program survey responders. Because the survey aimed to assess alcohol practices at the organizational level, trauma center staff, such as trauma program coordinators and front-line practitioners involved in day-to-day alcohol screening and intervention procedures, were identified for contact. After providing informed consent, trauma program staff had the option of completing Web-based, hardcopy, or telephone interview questionnaires. Providers were reimbursed \$20 after completion of the questionnaire. The University of Washington Institutional Review Board approved all study procedures before protocol implementation.

Development of the Disseminating Organizational Screening and Brief Intervention Services at Trauma Centers Alcohol Practices Questionnaire

A questionnaire was developed to assess pre-ACS mandate Level I trauma center alcohol SBI practices. Selected items were adapted from an instrument previously used to assess emergency department SBI practices in the state of Connecticut.³⁴ Additional items were developed to capture current contextual factors in the delivery of trauma center SBI (Appendix).

The initial two items assessed respondent familiarity with the ACS mandate and knowledge of the trauma program's alcohol SBI services. Two items assessed recent trauma program changes in SBI delivery in the past 6 months and any earlier SBI training experiences. A series of four items then assessed trauma center alcohol SBI practices. Respondents were queried as to whether they used laboratory tests or screening questionnaires. If respondents answered yes, then subsequent items determined which laboratory tests (eg, BAC) or screening questionnaires (Michigan Alcohol Screening Test [MAST], Alcohol use Identification Test [AUDIT], CAGE [questionnaire-related acronym], TWEAK [questionnaire-related acronym]) were used. Items assessing the percentage of injured patients screened with each method were also included. Next, four items assessed alcohol intervention and referral practices for screen-positive patients. Respondents were asked what typically happens in screen-positive patients (eg, formal alcohol consult, informal discussion, nothing). Questionnaire items also identified which type of staff person responded to alcohol consults. Providers were asked if any of the following were typically included in an alcohol consult at their trauma center:

1. Additional assessment of psychosocial issues
2. Evidence-based bedside counseling techniques, such as motivational interviewing
3. Treatment referral for specialized alcohol services

Later items asked about hospital salary support for alcohol SBI services. Final questions assessed the background of the respondent (eg, position and years at the trauma center, professional degree).

Data analyses

We first examined the frequencies and distributions of organizational characteristics for all 204 US Level I trauma centers. Next, we used chi-square, *t*-tests, and Fisher's exact test statistics to compare the characteristics of responding and nonresponding sites. We then examined the frequencies and distributions of survey items.

Review of the literature and ACS/COT alcohol SBI requirements informed selection of six items as SBI practice quality indicators:

1. Routine performance of an alcohol laboratory test screen
2. Routine questionnaire screening for alcohol problems
3. Routinely requested consult for screen-positive patients
4. Additional assessment of psychosocial issues as part of an alcohol consult
5. Evidence-based bedside counseling as part of an alcohol consult
6. Treatment referral for specialized alcohol services as part of an alcohol consult

We used chi-square, *t*-test, and Fisher's exact test statistics to compare the organizational characteristics of centers that endorsed with those that did not endorse SBI quality indicators. Generic trauma center organizational characteristics assessed included ACS verification, geographic location (region of the county and rural status), teaching status (teaching hospital status, membership in council of teaching hospitals, number of interns/residents), population served (adult, pediatric, or combined), and number of hospital beds and injury admissions per year. Alcohol SBI-related organizational characteristics assessed included whether or not the trauma center had committed staff salary support for SBI, specialized SBI training, or changes to SBI service delivery in the past 6 months. Organizational characteristics positively associated with SBI quality indicators at the $p < 0.05$ level are reported. When 2 or more organizational characteristics were significantly associated with SBI characteristics, logistic regression with simultaneous entry of variables significant at the $p < 0.05$ level was used to assess for significant independent associations.

RESULTS

Of 204 Level I centers identified, staff at 8 sites refused participation and staff at 57 sites did not respond, leaving 148 (73%) survey participants. Responding centers did not differ substantially from nonresponding centers with regard to ACS accreditation status, region of the country or rural status, population served, university affiliation, or volume of hospital beds. Responding trauma centers, on average, had more interns and residents (responder mean 252, SD 168, versus nonresponder mean 143, SD 202; $t(223) = 4.3$; $p < 0.001$). Median number of contacts required before response was 4 (range 1 to 10). Trauma centers responded to the survey between June 14, 2006, and November 6, 2007, with > 95% of responses occurring before spring 2007.

Approximately 50% of responding sites were ACS-accredited (Table 1). Eighty-eight percent of responding centers were from major metropolitan areas and only 12% from rural areas. More than three-quarters of trauma centers were teaching hospitals with university affiliations. Average number of hospital beds was 568 (SD 220), and on average Level I trauma centers reported admitting 2087 (SD 1,284) injured patients per year.

The majority of trauma center survey respondents were nurses (Table 2). On average, responders had > 10 years of work experience at the trauma center.

Approximately 75% of responders rated themselves as “extremely knowledgeable” or “very knowledgeable” about their trauma centers’ SBI services (Table 3). Fewer than 50% rated themselves as “extremely knowledgeable” or “very knowledgeable” about the ACS/COT alcohol SBI requirements.

With regard to screening practices, > 70% of sites were using laboratory screening methods, and 39% of sites endorsed regularly asking a screening question (Table 3). Thirty-four percent of responders endorsed using both laboratory tests and questionnaire items, 45% reported using only one screening modality, and 21% used neither.

At 70% of the sites that endorsed BAC administration, not all injured patients were screened. Median number of patients screened with laboratory tests was 56%, with approximately 40% of sites screening > 75% of patients and 20% of sites screening < 10% of patients. Also, at the 39% of sites where questionnaire items were used, the median number of patients administered questionnaires was 41%, with approximately 30% of sites screening > 75% of patients and 40% of sites screening < 10% of patients.

With regard to intervention for screen-positive patients, approximately one-fourth of trauma centers endorsed requesting a formal alcohol consult (Table 3). A wide range of providers were involved in alcohol evaluation and interventions, including social workers, nurses, psychiatrists, chemical dependency counselors, psychologists, and resident and attending surgeons. More than 60% of sites endorsed additional assessment and referral of screen-positive patients; these activities were reported to occur in > 75% of screen-positive patients. More than 40% of sites reported delivering evidence-based bedside counseling techniques, such as brief negotiated interventions or motivational interviewing interventions, or both. Fewer than one-third of sites committed trauma center funding specifically for SBI services.

SBI-related organizational characteristics were more likely to impact SBI quality indicators compared with generic trauma center organizational characteristics. In bivariate comparisons, trauma center funding for SBI was associated with routinely performing alcohol laboratory testing, routinely asking screening questions, and performing evidence-based bedside interventions. Changes in the past 6 months to SBI services were associated with routinely performing a laboratory test, routinely asking screening questions, request of a formal alcohol consult for screen-positive patients, and performing evidence-based bedside interventions. Having undergone specialized training was associated with routinely performing a laboratory test and routinely asking screening questions. University affiliation was associated with requesting a formal alcohol consult when patients screened positive. The only quality indicator for which ACS accreditation was substantially associated was the additional assessment of psychosocial issues when alcohol consultation occurs.

In logistic regression analyses, changes to SBI service delivery in the past 6 months remained significantly associated with formal alcohol consultation for screen-positive patients (odds ratio [OR]: 3.45; 95% CI, 1.41 to 8.49) and delivery of evidence-based interventions (OR: 4.06; 95% CI, 1.17 to 14.09). Trauma center funding for SBI remained significantly associated with delivery of evidence-based bedside interventions (OR: 6.78; 95% CI, 1.66 to 27.73). None of the generic trauma center organizational characteristics remained significantly associated with SBI quality indicators in the logistic regression analyses.

DISCUSSION

This is the first investigation to assess alcohol SBI practices for nearly all Level I trauma centers in the US. The vast majority of sites were surveyed before widespread knowledge of the new ACS/COT alcohol SBI requirements. To our knowledge, no sites had yet undergone

verification site visits that included the new SBI criteria. Also, 75% of survey respondents rated themselves as very or extremely knowledgeable about their trauma center's alcohol program. Results can be taken to represent nationwide pre-ACS mandate alcohol SBI practices.

Findings of the investigation add to a growing body of literature on alcohol SBI at trauma centers. Earlier reports have surveyed trauma providers about alcohol SBI beliefs and practices,^{29,30} examined obstacles to widespread implementation of SBI procedures,^{35–37} and described SBI guidelines and procedures.^{32,38–41} The current study builds on and extends these earlier reports by describing the current status of alcohol SBI practices at the trauma center organizational level nationwide.

More than 70% of sites appear to be using laboratory tests to screen for alcohol, making this the primary method of alcohol screening currently in use. Approximately 40% of sites were screening with one or more single alcohol items or questionnaires. A number of questionnaires were being used for screening, including the CAGE, AUDIT, and MAST. This survey documented that patients who screened positive received a variety of services, ranging from one episode of bedside counseling to a referral for counseling by an alcohol treatment specialist. Marked variability was observed in the frequency and type of service provided, with only 40% of patients receiving counseling techniques that are evidence based and that have proved effectiveness with injured patients. This study indicates that before the ACS/COT mandate, administration of evidence based alcohol interventions in trauma centers has not been routine.

The current investigation also represents an initial attempt to define alcohol SBI quality indicators and to describe the association between organizational characteristics and quality indicators. Alcohol SBI-related organizational characteristics, such as trauma center salary support for alcohol SBI providers and recent modifications in SBI service delivery, were the variables most strongly associated with routine screening and higher-quality intervention activities, such as formal alcohol consults and delivery of evidence-based alcohol interventions. A key observation was that generic trauma center organizational characteristics, such as admission volume, region of the country, ACS verification status, and teaching hospital status, were not independently associated with alcohol SBI practices. Instead, SBI-related organizational characteristics, such as recent training or service changes or the assignment of funding for alcohol screening, were associated with higher-quality alcohol SBI practices. Future investigations might productively assess the impact of organizational-level interventions on SBI quality indicators.

This investigation has several limitations. Inferences derived from the study are limited by the 73% survey response rate. This limitation is mitigated in part by the observation that for the vast majority of organizational characteristics, responding trauma centers did not substantially differ from nonresponding trauma centers. Also, heterogeneity in responder background and trauma program knowledge could contribute to variability in the accuracy of responses across Level I sites. Many responses relied exclusively on respondent self-report without collateral assessments, such as site visit, chart review, or trauma registry confirmatory data. Finally, a key survey omission was information on screening and intervention services for use of illicit drugs.

Beyond these limitations, we believe the investigative findings have important implications for alcohol SBI practice and policy. The investigation, for the first time, documents nationwide alcohol SBI practices before implementation of the ACS/COT mandate. We observed marked variability across Level I trauma centers in the percentage of patients screened and in the nature and extent of intervention delivery in screen-positive patients.

Although the ACS mandate is a remarkable first step, the findings are consistent with earlier surveys that suggest policy requirements might not directly translate into widespread implementation of high-quality, evidence-based SBI procedures. A study by Degutis,³⁴ which evaluated an earlier statewide trauma center SBI mandate in the state of Connecticut, met with mixed success, which suggests that policy initiatives alone might not result in delivery of high-quality SBI services in the absence of adequate training and support. Organizational behavior research^{42,43} provides a model for trauma center adoption, implementation, and integration of SBI services. Just as there are instruments to measure an individual's readiness for behavioral change,⁴⁴ organizational psychologists have articulated a program readiness-for-change model that can guide the integration of SBI services into routine trauma center practice.^{42,43}

In summary, this investigation documents baseline alcohol SBI practices at US Level I trauma centers before extensive ACS/COT mandate-related changes had occurred. The investigation observed marked variability across Level I trauma centers in the percentage of patients screened for alcohol and in the nature and extent of intervention delivery in screen-positive patients. In the wake of the ACS/COT requirement, future research could systematically implement and evaluate training in the delivery of evidence-based alcohol interventions and training in the development of trauma center organizational capacity for the sustained delivery of alcohol SBI.

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Abbreviations and Acronyms

ACS/COT	American College of Surgeons Committee on Trauma
BAC	blood alcohol concentration
OR	odds ratio
SBI	screening and brief intervention

Appendix

Disseminating Organizational Screening and Brief Intervention at Trauma Centers, Baseline Survey

- On a scale from 1 to 5, 1 being not at all knowledgeable and 5 being extremely knowledgeable, how would you rate your own knowledge about your trauma center's current practices concerning alcohol screening and brief interventions for trauma patients admitted to your hospital?

1	2	3	4	5
Not at all		Somewhat		Extremely
knowledgeable		knowledgeable		knowledgeable
- Before today, what was your familiarity with any American College of Surgeons (ACS) requirements for alcohol screening and brief intervention services?

____ MAST _____ CAGE _____ TWEAK
____ AUDIT _____ I don't know
____ OTHER (Specify): _____

_____ Percent (%) _____ I don't know

Open-ended response: _____

(INTERVIEWER CODES):

_____ Nothing

_____ Informal discussion of alcohol occurs with the patient

What % of time? _____

_____ A formal alcohol consult is requested

What % of time? _____

_____ Do not know

_____ Other routine procedure (explain): _____

Open-ended response: _____

☐ Social worker
☐ Chemical dependency counselor
☐ Attending surgeon
☐ Surgery residents
☐ Psychologist
☐ Psychiatrist
☐ RN
☐ Other (specify): _____
☐ No one is designated
☐ Uncertain who is called

Further assessment of psychosocial issues:

1 2 3
 Yes No I don't know
 _____ If yes, % of time?
 Evidence-based bedside counseling techniques, such as brief
 negotiated interventions or motivational interviewing?
 1 2 3
 Yes No I don't know
 _____ If yes, % of time?
 Treatment referral for specialized alcohol services?
 1 2 3
 Yes No I don't know
 _____ If yes, % of time?
 If yes: _____ Inpatient services _____ Outpatient services _____ Detox
 _____ Other (specify): _____

14 Does your hospital currently have salary support (FTE to any individual[s]) to provide alcohol screening and brief intervention?

_____ Yes _____ No _____ I don't know
 If yes, then:
 How many FTE? _____ Who are the individuals?
 TPC BACKGROUND
 Participants' title: _____
 Profession:
 _____ Nurse _____ Physician _____ PA
 _____ Chemical dependency counselor
 _____ Other (specify): _____
 Length of time working with the current trauma center:
 _____ years (if less than 1 year: _____ months)
 Years since graduation from professional education program:
 _____ years (if less than 1 year: _____ months)
 Type of degree:
 _____ High school diploma/GED
 _____ Associate's degree
 _____ Bachelor's
 _____ Master's
 _____ Doctorate
 _____ Other (specify) _____
 Self-described ethnocultural heritage: _____
 Gender: _____ Male _____ Female

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Table 1

Organizational Characteristics of US Level I Trauma Centers (n = 204)

Characteristic	n	%
ACS accredited	100	48.8
Region of country		
Midwest	65	31.7
South	58	28.3
Northeast	50	24.4
West	32	15.6
Rural status	38	15.5
Population served		
Adult	93	45.4
Adult and pediatrics	83	40.5
Pediatrics	22	10.7
Missing	7	3.4
Teaching hospital	193	94.1
Council of teaching hospitals	152	74.1
University affiliation	159	77.6
Mean ± SD		
No. of interns/residents	252 ± 168	
No. of hospital beds	568 ± 220	
No. of injury admissions	2,087 ± 1,284	

ACS, American College of Surgeons.

Table 2

Characteristics of Trauma Program Respondents (n = 148)

Characteristic	n	%
Position		
Nurse	94	63.5
Physician	31	29.9
Other professions	13	8.8
Missing	10	6.8
Gender		
Female	97	65.6
Male	36	24.3
Missing	15	10.1
Degree		
Master	60	40.5
Bachelor	34	23.0
Doctorate	32	21.6
Associate	8	5.4
Missing	14	9.5
Race		
Caucasian	104	70.3
African American	3	2.0
Asian	3	2.0
American Indian	1	0.7
Hispanic	1	0.7
Missing	36	24.3
Mean $\pm$ SD		
Years at trauma centers	11.2 $\pm$ 7.7	
Years since graduation/training	17.6 $\pm$ 9.1	

Table 3

Trauma Center Alcohol Screening and Brief Intervention Characteristics (n = 145)

Characteristic/practice	n	%
Provider self-rating of knowledge regarding alcohol services delivery		
Extremely knowledgeable	55	37.9
Very knowledgeable	54	37.2
Fairly knowledgeable	27	18.6
Somewhat knowledgeable	4	2.8
Not at all knowledgeable	3	2.1
Missing	2	1.4
Provider self-rating of familiarity with ACS requirements		
Extremely knowledgeable	22	15.2
Very knowledgeable	46	31.7
Fairly knowledgeable	43	29.7
Somewhat knowledgeable	20	13.8
Not at all knowledgeable	14	9.7
Institution has had specialized training	54	37.2
Changes to SBI services in past 6 months	40	27.6
Percent of injured patients receiving laboratory test (mean $\pm$ SD)	56 $\pm$ 35.8	
Institution routinely performs a laboratory test	105	72.4
Tests performed*		
Blood serum	103	71.0
Urine	47	32.4
Breathalyzer	7	4.8
Other test performed	2	1.4
Institution routinely asks screening questions	57	39.3
Percent of injured patients receiving screening questions (mean $\pm$ SD)	41 $\pm$ 41.0	
Screening questions asked*		
CAGE	36	24.8
Other	14	9.7
AUDIT	11	7.6
MAST	4	2.8
Single item	3	2.1
Activities when patient positive for alcohol use*		
Informal discussion	40	27.6
Formal consult	38	26.2
Other unspecified routine activity	79	54.5
Nothing	8	5.5
Staff who provides services*		

Characteristic/practice	n	%
Social worker	89	61.4
Nursing	36	24.8
Psychiatrist	26	17.9
Chemical dependency counselor	22	15.2
Other	18	12.4
Psychologist	19	13.1
Attending surgeon	19	13.1
Surgery resident	13	9.0
No designated staff person	12	8.3
Uncertain	5	3.4
Activities when consultation occurs *		
Additional assessment of psychosocial issues	92	63.4
Referral for specialized alcohol services	98	67.6
Brief intervention and counseling	59	40.7
Percent of time additional assessment occurs (mean $\pm$ SD)	84 $\pm$ 27.2	
Percent of time referral occurs (mean $\pm$ SD)	84 $\pm$ 27.4	
Percent of time brief intervention occurs (mean $\pm$ SD)	78 $\pm$ 30.7	

ACS, American College of Surgeons; AUDIT, Alcohol use Identification Test; CAGE, (questionnaire-related acronym); MAST, Michigan Alcohol Screening Test; SBI, screening and brief intervention.

* More than 1 response was accepted and percentages might sum to > 100%.