

Session 2: Substance Abuse Interventions for Trauma Patients—Biosketches

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Session 2: Substance-Abuse Interventions—Setting the Stage for Discussion

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INTRODUCTION

My task is to “set the stage,” so to speak, by briefly outlining the reasons why brief interventions for patients with alcohol and substance abuse problems should be implemented in trauma centers and emergency departments (ED).

Trauma centers and EDs are hectic environments where clinicians must identify and treat life-threatening injuries under difficult time constraints. These environments are the antithesis of office practices where there is much more time for discussion between clinician and patient. In office settings, patients sit comfortably in chairs or on examining tables, face the clinician, and are in little to no distress. Distractions are minimal; there are no persistent intercom pages or beeping monitoring equipment in the background. But despite the distractions and time constraints, both trauma centers and EDs offer great potential for intervention; more so, in fact, than office practices. Although ongoing patient-care activities and concerns still are distractions—activities like additional surgeries and diagnostic procedures, patient-care rounds, wound care, physical therapy, pain management, or visitors who further limit time and access to the patient—

the reasons why patients present at either center sets the stage for discussion.

Compared with patients seen in EDs, a larger proportion of trauma center patients have alcohol use problems. Studies show 15% to 25% of ED patients screen positive for pre-injury alcohol use.^{1–3} In contrast, 25% to more than 50% of trauma center patients screen positive for alcohol.^{4–7} These results indicate that alcohol abuse is a common element of injury in both treatment settings.

Efforts to establish testing of patients for alcohol and other drugs as clinical protocol began more than 30 years ago when Dr. R. Adams Cowley founded the Shock Trauma Center (STC) at the University of Maryland. Through his leadership, Maryland’s Emergency Medical Services (EMS) system was created⁸ and routine testing began for all patients admitted to the trauma center. Toxicology tests were obtained for clinical reasons—not for legal reasons—to identify patients with substance use problems and to manage pain. With funds from the Maryland Department of Transportation, we created a confidential toxicology database of STC patients. This database is housed and maintained at the National Study Center for Trauma and EMS of the University of Maryland School of Medicine.⁷

In recent years, more than 6,000 patients have been admitted annually to the Shock Trauma Center; more than 80% of the injuries have occurred in rural, suburban, and urban areas. More than 95% of these patients have been tested for alcohol without any bias toward gender, minority status, or whether they are victims of violence.⁷ These test results are germane to these proceedings because the center’s patient profile is similar to the aggregate adult (≥ 14 years of age) trauma population in the American College of Surgeon’s (ACS) National Trauma Data Bank.⁹ For example, in fiscal year 2002, 72% of STC patients were men compared with 64% men in the ACS databank; 66% of STC patients were ages 21 to 54 compared with 62% of ACS patients age 20 to 54; 45% of STC patients were vehicular crash occupants compared with 43% of the ACS patients; and 43% versus 16%, respectively, were victims of violence.

Overall, 21% of STC patients tested positive for alcohol, 81% of which had a blood alcohol concentration (BAC) of ≥ 80 mg/dL, which now defines impaired driving in most states. The highest positive BAC test rate of 27% was among

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those ages 21 to 34, but 11% of patients age 55 or older, and 15% of patients younger than 21 also tested positive for alcohol. Men tested positive at a rate more than twice that of women (25% versus 12%). However, most men (80%) and women (75%) with positive screening results had a BAC \geq 80 mg/dL. Finally, even though the highest percentages of BAC-positive patients were victims of violence and pedestrians who were struck by vehicles (28% and 25%, respectively), 21% of vehicular crash occupants and 15% of other victims of unintentional injuries were BAC positive (National Study Center for Trauma and EMS, unpublished data, 2003).

The percentage of patients admitted to the STC who test BAC positive has decreased steadily in recent years. In the mid-1980s, more than one-third of patients age 21 and older tested positive. By 2000, less than one-quarter tested BAC positive. Throughout this period, about 10% of patients ages 14 to 17 treated in this adult trauma center tested positive for alcohol.⁷ The most common answer given by injured patients to, "How much have you had to drink?" was "Two beers." Hard data suggest otherwise. The mean BAC level for all alcohol-positive or screen-positive age groups of trauma patients exceeds 100 mg/dL (154 mg/dL for men and 142 mg/dL for women). Trauma patients younger than 21 had mean BACs of 111 mg/dL (National Study Center for Trauma and EMS, unpublished data, 2001).

Clark, McCarthy, and Robinson published a seminal editorial in the *Annals of Emergency Medicine* characterizing "trauma as a symptom of alcoholism."¹⁰ That observation was corroborated in a prevalence study of alcohol use problems among STC patients using standardized criteria.¹¹ Overall, 24% of patients were found to be alcohol dependent at the time of injury. Of this group, 27% to 28% of patients ages 21 to 60 were alcohol dependent; and 13% of the remaining patients (those younger than 21 or older than 60) were alcohol dependent.

A word about semantics is in order. The use of language affects how trauma patients with alcohol-use disorders are regarded. The terms *alcoholism* and *alcoholic* historically have pejorative and negative connotations that imply moral deficits. It is better to use the term *alcohol dependent*, which refers to the more appropriate disease model. However, alcohol dependence represents the most severe end of the spectrum of patients with alcohol-use disorders. Further, it is not uncommon to encounter patients who were intoxicated when they were injured, but who are not dependent. Finally, another important consideration is that among the relatively younger patients admitted to trauma centers,⁹ many have alcohol-use disorders, but are not alcohol dependent. Nonetheless, their alcohol use frequently results in severe injuries.

Published reports of results where both screening methods and standardized criteria were used to detect alcohol use disorders, reveal that 15% to 20% of injured patients treated in EDs have such disorders,^{2,3} compared with a much higher prevalence among patients admitted to trauma centers (25%–50%).^{3,5,11} Because the mean age of trauma center

patients is 30 to 35 years, we can assume that patients who screen positive are better candidates for intervention than patients with a longer history of alcohol-related problems. This observation has important treatment implications, because brief intervention techniques are probably less effective for patients with long-standing chronic alcohol dependence.

A study led by Dr. Patricia Dischinger provides compelling data on substance abuse interventions in trauma centers.¹² A national search for death certificates for more than 27,000 STC patients found that 1,631 had died 1.5 years to 14.5 years following discharge. Subsequent trauma was the cause of death among 35% of those who had tested positive for alcohol or other drug use at the index trauma admission. This percentage was almost six times higher than the percentage of Americans who died from injury in 1994 (6.4%), the year immediately preceding the end of the study period.

Most data on alcohol dependency force us to answer Dr. David Lewis's question, which he posed at the earlier Centers for Disease Control and Prevention conference on alcohol use problems and injury in emergency room settings: "How can we possibly continue to treat the complications of an underlying disease without addressing the disease?"¹³ This is what we have been doing for decades. In the past, many have held a common belief that "a drunkard in the gutter is just where he ought to be,"¹⁴ or that getting drunk is the result of "enfeeblement of the moral principle."¹⁵ As Dr. Trunkey has stated, alcohol-dependent trauma patients have "a treatable disease." It is exciting now to be at this place of change.

In the mid-1990s, Dr. Thomas Scalea assumed the position of surgeon-in-chief of Maryland's Shock Trauma Center. He asked clinicians from the center's Substance Abuse Consultation Service if there was reliable evidence available to document whether it was worthwhile to spend time on interventions. Their answer was, "No." Indeed, at that time there were no hard data relative to trauma patients. However, now that studies among trauma patients show that brief interventions are feasible and can lead to salutary results, it is time to move forward and implement interventions in trauma centers and EDs. This will require coordinated effort among trauma clinicians, health care administrators and health care policy makers.

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Screening and Interventions for Alcohol and Drug Problems in Medical Settings: What Works?

Thomas F. Babor, PhD, MPH, and Ronald M. Kadden, PhD

This article summarizes current knowledge about the accuracy of screening tests and the efficacy of interventions for substance use disorders in different medical settings (including trauma centers) where the practitioners are not specialists in the management of substance use disorders. In the first section, we introduce basic screening approaches for psychoactive substance use disorders and issues of natural history, risk factors, and

populations at risk. Next, we review recent scientific research on the development of screening tests and the evaluation of early intervention services for persons at risk. We conclude that reliable and valid screening tests are available to detect alcohol use disorders but that further work is needed before routine screening for drug use disorders is warranted. We found strong evidence to support the effectiveness of brief interventions in man-

aging at-risk drinkers; however, the evidence is only suggestive for drug use disorders. Finally, we explore the implications of the findings for developing a public health approach to early intervention, particularly as it relates to the unique needs of trauma centers.

Key Words: Screening, Early identification, Case finding, Alcohol, Drug abuse, Substance use disorders.

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Substance use problems involve a broad spectrum of social, medical, and psychologic disabilities that affect a significant proportion of the adult and adolescent U.S. population.¹ The people most visibly affected are those who have developed a syndrome of substance dependence—a psychiatric disorder characterized by impaired control over substance use, neuroadaptation (tolerance and withdrawal), and increased salience of drug seeking.² Less prominent but far more numerous are people who excessively use psychoactive substances (illegal drugs, prescribed pain medications, and alcohol or tobacco) but who are not dependent on alcohol or drugs. Essentially, there are two “worlds” of substance use disorders. One is characterized by dependence and frequent substance-related consequences; the other is characterized by intermittent use with occasional consequences. Each requires

different approaches to screening, diagnosis, and clinical management.

Before recommending that screening, early intervention, and routine treatment procedures be routinely applied in health care settings, at least four conditions should be met: the target disorder should have sufficient conceptual clarity to permit reliable measurement; the natural history of the target disorder, along with risk factors and populations at risk, should be fairly well understood; the screening test used should be reliable, valid, inexpensive, easy to administer, and acceptable to both providers and the target population; and appropriate treatments (or brief interventions) should exist so that the treatment of persons identified can be managed effectively.^{3,4} Furthermore, the delivery mechanism for the intervention should be feasible.

The scientific basis for these conditions is described in the remainder of this article. We conclude that the four conditions have indeed been met. By assessing the implications of our findings as they relate to the unique needs of trauma centers, we explore whether taking a public health approach to early intervention for psychoactive substance use disorders is feasible. The public health approach includes early intervention efforts designed to identify and manage populations at risk of developing substance use disorders. These efforts should be based on a careful definition of the target condition and the use of population screening procedures followed by appropriate interventions.

SCREENING APPROACHES: UNDERSTANDING THE TARGET DISORDER

Any discussion of screening for substance use disorders or risk of these disorders is complicated because a wide variety of substances can be classified as psychoactive

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agents. These agents include illegal drugs (i.e., crack cocaine, heroin, and marijuana); legal substances (i.e., alcohol and tobacco); and prescribed pain medications such as OxyContin that have high abuse potential.

Screening is a preliminary procedure used to determine the likelihood that an individual has a particular disease or condition or is at increased risk of developing health or social problems. Screening assesses risk factors, which can be genetic, behavioral, or environmental. Screening also helps distinguish between those who could benefit from a minimal intervention and others who may require further diagnostic assessment or possible treatment. When screening is used to identify persons at risk, it is called screening for risk factors. When the aim of screening is to identify cases that warrant a formal diagnosis, it is called case finding. The distinction between these two concepts lies in the type of intervention that follows the screening process.

Screening for Risk Factors

If the risk factors for psychoactive substance disorders can be identified early, screening efforts can focus on those who have not yet developed dependence or serious substance-related problems. The purpose of screening is either to prevent substance-related disabilities in persons at risk or to prevent further harm among those in the early stage of substance use. Initial screening may be followed by brief educational and motivational interventions designed to minimize harm and reduce substance use.

Case Finding

Case finding identifies those who already have a substance-related health condition or problem that warrants a formal diagnosis for treatment. Treatment is designed to prevent the progression of dependence or the onset of additional substance-related problems.

A World Health Organization memorandum⁵ defines hazardous use as a level of substance use likely to result in harm. In contrast, harmful use is defined as use that has already resulted in adverse mental or physical effects. This terminology provides clinicians and researchers with guidelines to identify individuals at risk who do not meet formal criteria for psychoactive substance dependence.² Hazardous and harmful use should be the primary targets of early intervention programs. Such programs usually cost less than full-scale treatment for alcohol or drug dependence and may even preclude the need for subsequent treatment. We believe that substance use disorders can be defined with sufficient clarity to serve as targets for screening and early intervention programs. It follows that the conceptual clarity permits reliable measurement.

SUBSTANCE USE: POPULATIONS AT RISK, RISK FACTORS, AND NATURAL HISTORY

Since the 1970s, school surveys have consistently shown that substance use begins and rises dramatically during early

adolescence, with the risk of developing diagnosable substance dependence reaching a peak between the ages of 15 and 25.⁶ Substance use varies considerably according to gender, socioeconomic status, ethnic group membership, and urbanicity.⁷ A variety of personality factors are also involved in initiating and maintaining substance use, and some of these personality factors are related to the types of medical consequences that come to the attention of health care providers. For example, Jonah et al.⁸ found that college students who scored high on the personality measure sensation seeking engaged in more driving-related risky behaviors, drank more frequently, were more likely to drive after drinking, and believed they could drink more before becoming impaired.

Babor et al.⁹ found a strong association between sociopathy and alcohol-related trauma. Sociopathy is a general personality trait characterized by strong tendencies to seek stimulation, a diminished capacity to inhibit ongoing behavior, and an inability to learn from punishing experience. These data suggest there may be greater risk of traumatic injury among heavy drinkers and drug users who have personality characteristics associated with risk taking, sociopathy, or sensation seeking. The association of these vulnerabilities with both the early development of substance use disorders and the progression along a more severe course are important factors in screening, diagnosis, and treatment planning.

Epidemiologic research has also identified the consequences of using substances likely to be encountered in medical settings. Two general types of consequences can be distinguished. The first, short-term consequences, is associated with the effects of acute intoxication and include acute panic reactions, traumatic injuries, and changes in interpersonal behavior (e.g., aggression). The second, long-term consequences, emerges after chronic ingestion of psychoactive substances. Long-term consequences include physical health problems and impaired psychosocial development caused by interference with important developmental tasks—such as education, emotional development, peer socialization, or identity formation.^{10,11} Regular use of a psychoactive substance is closely associated with the development of pharmacologic dependence and may also increase the risk of other substance use.⁷

Much has been learned in recent years about the natural history of substance use disorders: substance use disorders are broadly distributed throughout the population, but they are particularly prevalent among young adults. Prevalence rates are driven disproportionately by users with less severe disorders. These users are typically uninterested in or are found inappropriate for formal, specialized treatment services. Alcohol and marijuana are the most commonly used substances. The same personality factors that predispose one to substance use disorders may increase the likelihood of traumatic injuries.

These findings provide a sound empirical basis for designing screening and brief intervention programs that take

into account the diverse nature of psychoactive substances and of the users themselves. Research also suggests that trauma centers and emergency departments may be particularly appropriate medical settings for early identification of psychoactive substance users because of the demographic and personal characteristics of patients encountered in these settings.

SCREENING TESTS: SELF-REPORT AND BIOLOGICAL

An important prerequisite for a public health approach to screening is the availability of one or more screening procedures that can be used with different population groups in a variety of settings. In this section, we review the current status of two types of screening procedures: self-report and biological. The primary focus is on screening tests supported by research that demonstrates acceptable sensitivity and specificity; feasibility in terms of time to administer and score; applicability to critical target populations; and appropriateness for trauma centers and emergency departments.

Alcohol Screening

Alcohol screening has gained popularity in health care settings, not only because of the extent of problem drinking and its impact on health but also because of the development of new screening technologies, encouraging research, expert committee recommendations, and mandates to conduct routine alcohol screening.^{12,13} One of the first alcohol screening tests, the Michigan Alcoholism Screening Test (MAST),¹⁴ consists of 24 yes or no questions about the signs and symptoms of severe alcohol dependence. The MAST has been criticized because of its length, its potential for falsification, and its focus on screening for alcohol dependence rather than for early identification of risk factors. A shorter, 12-question version of MAST¹⁵ and the four-question CAGE screening test¹⁶ increase the feasibility of screening but still focus on identifying active alcohol dependence. A disguised screening test based on the patient's history of traumatic injury¹⁷ was developed to deal with the falsification problem, but this was done at the expense of sensitivity and specificity. A number of alcohol screening tests have been developed for special populations, including women^{18,19} and the elderly.²⁰ The World Health Organization developed the Alcohol Use Disorders Identification Test (AUDIT),²¹ which focuses on both hazardous drinking and alcohol use disorders.²²

Although not recommended for routine screening, several biological markers have been useful adjuncts to alcohol screening in emergency medicine and criminal justice settings: blood alcohol concentration, gamma-glutamyltransferase (a liver enzyme), and carbohydrate-deficient transferrin. Blood alcohol concentration has a short half-life and does not provide information about risk behavior other than to estimate the extent of recent drinking. Gamma-glutamyltransferase and carbohydrate-deficient transferrin have not

been found to be sensitive or specific enough for use in general medical settings.²³

Drug Screening

A number of different approaches have been developed to screen for illegal drug use using self-report and biological screening tests.^{24–26} Given the different needs and substance use patterns of adults and adolescents, self-report screening tests have generally been designed and validated for one or the other of these populations.

Screening Tests for Adults

There are two different types of self-report screening tests for adults. The Drug Abuse Screening Test (DAST),^{27,28} modeled after the Michigan Alcoholism Screening Test,¹⁴ consists of 10 direct questions that yield a quantitative index of problems associated with drug use. Originally, the DAST comprised 28 questions; following an initial validation study, the number of questions was reduced to 20, and then DAST was further revised to produce a highly reliable 10-question scale.

In contrast to screening tests that ask direct questions about substance use and related problems, a second type of test has been developed to correlate or measure risk factors that suggest an actual or potential substance use disorder. One such example, the revised version of the Minnesota Multiphasic Personality Inventory (MMPI-2), contains two scales to assess alcohol and drug problems: the Addiction Acknowledgment Scale (AAS) assesses willingness to acknowledge problems with alcohol or other drugs; and the Addiction Potential Scale (APS) identifies individuals with a potential for developing alcohol or other drug problems. APS has no items that address substance use directly, whereas AAS is a collection of items that directly assess open acknowledgment of problems. Both AAS and APS have performed well in validation research.²⁹

Screening Tests for Alcohol and Drugs—Adolescents

Until recently, there have been few adolescent-specific screening instruments. Recognizing the need for this type of comprehensive, multidimensional screening instrument, the U.S. National Institute on Drug Abuse developed the Problem-Oriented Screening Instrument for Teenagers (POSIT).³⁰ This 139-item screening questionnaire was designed as the first stage in a sequential assessment system intended to improve the evaluation and referral of substance-involved youth. The POSIT indicates whether a problem may exist in 10 functional areas: substance use and misuse; mental health status; physical health status; aggressive behavior and delinquency; social skills; family relations; educational status; vocational status; peer relations; and leisure and recreation. After screening, a more comprehensive diagnostic assessment can be given in those areas where the POSIT indicates a potential problem. Among adolescents referred to an as-

assessment service, McLaney et al.³¹ found the test reliable and valid for evaluating substance use disorders.

In contrast to the comprehensive, multidimensional screening included in the POSIT, several shorter screening instruments have been developed specifically for substance use among adolescents. The Personal Experience Screening Questionnaire (PESQ)³² is a 38-item instrument that focuses on substance use and resultant problems. The PESQ has acceptable reliability and validity in detecting individuals with different histories of substance use.³³ The Substance Abuse Subtle Screening Inventory (SASSI)³⁴ is a 78-item self-report that classifies adolescents as chemically dependent. Although designed to prevent faking by using indirect questions, the SASSI has not produced consistently accurate results.³⁵ The Drug and Alcohol Problem (DAP) Quick Screen³⁶ was developed for use by pediatricians. This questionnaire focuses on substance use and related behaviors. The DAP Quick Screen originally had 42 questions; it has been revised to 30 questions that yield acceptable validity data.³⁷

Multiple Risk-Factor Screening

Despite advances in developing accurate and feasible self-report screening tests for a variety of psychoactive substances, considerably less attention has been paid to developing multiple risk-factor screening tests. Such tests would screen for a variety of health risk factors and thereby serve to embed questions about drug use in the context of a broader health survey.

Depending on the demographic characteristics of a given population and the expected prevalence rates for specific types of substance use disorders, one approach would be to “mix and match” existing screening tests. For example, Davis and Bush³⁸ developed a screening program for female patients that focused on past-year smoking, drinking, other drug use, and psychiatric disorders. The survey contained items from a variety of standardized screening tests. This approach may be efficient for a small number of risk behaviors, but combining questions from various tests could be confusing for both patients and clinic staff because of different questioning procedures and response formats.

Another approach would be to develop a combined screening test with instructions, time frames, risk behaviors, response formats, and scoring procedures that are comprehensive, integrated, and systematic. For example, the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST)³⁹ was developed to screen for at-risk use of psychoactive substance use and related problems, such as traumatic injuries. The ASSIST screens for 11 psychoactive substances, including injection drug use. Its format provides a way of estimating the relative importance of different risk behaviors so that counseling interventions can be prioritized.

Screening for multiple substances could result in a significant provider burden. A relatively simple procedure that addresses this problem is a screening test called CAGE (a mnemonic title that refers to the four-item test) or the CAGE-

AID test—the version “adapted to include drugs.” A study of primary care patients found the CAGE-AID test more sensitive, but less specific, for substance use disorders than the CAGE test.⁴⁰

Biological Screening Methods

Drug screening through urinalysis, hair testing, and saliva tests is often favored because the results are more objective, although not necessarily more accurate than self-report measures.⁴¹ Currently, urinalysis is the preferred drug-screening method. Urinalysis is less invasive than blood testing, and drugs or drug metabolites tend to be present in relatively high concentrations in urine. Recently self-contained, easy-to-use urine testing kits have become available. These kits do provide rapid test results. However, information indicating the quantity, frequency, or time of drug ingestion is limited to drug use only over the previous few days. Test results also include a risk of false-positives (caused by passive drug exposure or ingestion of foodstuffs) and false-negatives (caused by the use of adulterants).

Evaluating Screening Tests

A number of important issues associated with biological and self-report screening tests must be addressed in the design of any early intervention program that is based on population screening in medical settings (e.g., trauma centers and emergency departments), as follows:

- **Reliability.** Most of these tests have been evaluated under research conditions, which tend to increase the likelihood of reliability (i.e., the extent to which results are consistent across time, conditions, and types of administration). However, random error is likely to reduce the accuracy of screening tests in clinical settings.
- **Construct validity.** Most self-report screening tests correlate well with other measures of the same construct (e.g., problem severity).
- **Cost and efficiency.** Self-report tests are free or inexpensive, but they require time for administration and scoring. Biological tests are more costly to use on a routine basis.⁴¹
- **Cultural sensitivity and generalizability.** Although research has not been extensive, there is no evidence suggesting that the reliability or validity of self-report tests varies across different ethnic groups.^{22,24}
- **Susceptibility to response bias.** A self-report test can be deliberately faked or distorted by subtle influences, such as presenting oneself in a socially desirable way. Even so, self-report measures of substance use tend to be valid and reliable under most circumstances. Accuracy depends on a variety of conditions, including the social context of the data-gathering situation and the motivation, cognitive impairment status, and other personal characteristics of the respondent.⁴²
- **Target groups.** Most screening tests have been designed for case finding rather than to identify risk factors for

drug abuse. Although subtle or disguised screening tests may be useful in screening for risk factors, they do not appear to be sufficiently sensitive or specific for identifying active cases. Comprehensive screening tests like the POSIT and ASSIST are capable of identifying both active cases and risk factors, but they require more time to administer and score.

• **Biological Tests.** Problems also exist with respect to biological screening methods.⁴¹ The handling of body fluids is a major limitation, in addition to their cost, invasiveness, and lack of sensitivity.

The U.S. Preventive Health Services Task Force⁴³ concludes there is sufficient evidence to warrant routine alcohol screening for all adult and adolescent patients in medical settings. In contrast, the Task Force concludes there is insufficient evidence to recommend for or against routine drug screening—self-report tests may be inaccurate and biological tests may be insensitive. Nevertheless, because of the prevalence of drug abuse and the resultant serious consequences, the Task Force suggests that health professionals ask questions about drugs when taking patient histories from adolescents or adults.

INTERVENTIONS

The fourth prerequisite of a public health approach to early intervention for substance use disorders is its potential for linkage with appropriate treatment or early intervention services. If intervention does not exist or is not feasible, why screen?

The term “intervention” includes any effort made to provide information or advice, to increase motivation to stop, to teach skills consistent with cessation of substance use, or to provide more intensive therapy. Among the least expensive interventions are brief motivational conversations between a substance user and a physician or other person with counseling skills. These interventions generally involve 1 to 3 sessions of relatively short duration, whereas brief treatment involves 3 to 15 therapy sessions by a trained provider. Brief treatment is not given detailed consideration in the section that follows. Instead, we emphasize studies of various brief interventions for alcohol and drug use disorders.

Evaluating the Effectiveness of Brief Alcohol Interventions

Bien et al. evaluated 32 controlled studies involving over 6,000 patients.⁴⁴ It was concluded that the course of harmful alcohol use can be effectively altered by relatively brief interventions in primary health care or employee assistance program settings. Kahan et al. reviewed 11 trials of brief intervention, concluding that brief alcohol interventions are effective and have considerable potential to impact public health.⁴⁵ Wilk et al. reviewed 12 randomized controlled trials, concluding that brief intervention in outpatient settings is a low-cost, effective preventive measure for heavy drinkers.⁴⁶ Moyer et al. reviewed studies comparing brief intervention

both to untreated control groups and to groups receiving more extended treatments.⁴⁷ They found “further positive evidence” for the effectiveness of brief interventions, especially among patients with less severe problems. Moreover, brief interventions are shown to be a cost-effective way of reducing alcohol consumption and associated problems.^{48,49} In an extensive review of the literature for the U.S. Preventive Services Task Force, Whitlock et al. concluded that alcohol counseling interventions among primary care patients are feasible and potentially highly effective components of an overall public health approach to reducing alcohol misuse.⁵⁰

Most of these studies have been conducted in primary care settings where the prevalence of alcohol abuse and dependence tends to be lower than that found in emergency and trauma centers. Emergency departments and trauma centers have been identified as high-yield settings for alcohol screening,^{51–53} but structural and attitudinal barriers may impede a systematic response in these settings. Nevertheless, a large randomized trial of brief interventions in a trauma center found that a brief motivational intervention was associated with decreased alcohol consumption and a reduced risk of trauma recidivism.⁵⁴

Evaluating the Effectiveness of Drug-Disorder Interventions

In contrast to alcohol literature, and despite numerous studies of brief treatment for persons with drug dependence, there are few studies of brief interventions for hazardous drug use. The majority of published studies on brief interventions have been for marijuana use disorders. Although some studies have used behavioral or cognitive-behavioral approaches, most interventions are based on a motivational approach. Motivational Interventions (MI) typically include feedback about the relative severity of drug use compared with national norms. This type of intervention includes discussion of the negative and positive aspects of continued use and examines factors contributing to use. Behavioral interventions generally reinforce achieving and maintaining abstinence. Cognitive-behavioral interventions typically focus on identifying both the trigger situations and training in the behavioral skills needed to cope with those situations. What follows is a brief review of studies that have applied these methods in the form of brief interventions for drug use disorders.

In adults, one or two sessions of MI were found to be more efficacious than no treatment at all.^{55–57} In two of the studies, longer interventions had greater efficacy than one or two brief MI sessions. When combined with training in cognitive-behavioral strategies, Lang et al. found that a single assessment reduced both the quantity and frequency of marijuana use.⁵⁸ However, because there was no control group, it is not possible to conclude that reductions in quantity or frequency were attributable to the intervention. In contrast, Baker et al.⁵⁹ found that a single motivational session with psychiatric inpatients had only a modest impact on substance use, with marijuana use remaining at a high level throughout

a 1-year follow-up period. All of these studies were conducted among adults who were chronic or heavy users of marijuana, most of whom met the diagnostic criteria for cannabis dependence.

Using two intervention groups and a control group, Baker et al.⁶⁰ compared the use of a self-help booklet for amphetamine abusers to the use of interventions consisting of one MI session combined with either one or three additional sessions of cognitive-behavioral therapy. Amphetamine use fell significantly for the sample as a whole, with no observable differences between the control group and two intervention groups. At the 6-month follow-up, the two intervention groups demonstrated greater abstinence than the control group.

Cormack et al.⁶¹ studied the effect of letters sent by general practitioners to patients who were long-term benzodiazepine users. The letter significantly reduced benzodiazepine use, as compared with a control group. The addition of a monthly information sheet did not enhance the effect of the initial letter. Compared with a control group, Bashir et al.⁶² found that a single consultation with a general practitioner, supplemented by a self-help booklet, reduced benzodiazepine prescriptions. The reductions in benzodiazepine use did not result in psychological harm or increased consultation with a general practitioner.

SUMMARY

Assessing the Effectiveness of Brief Interventions

Brief interventions for risky drinking and alcohol abuse are well supported in terms of their effectiveness and feasibility in primary health care and other medical settings.⁵⁰ Regarding brief interventions for drug abuse, one or two brief motivational interventions are superior to providing no treatment but may be less effective than longer interventions. In general, brief motivational interventions among marijuana users appear particularly efficacious, but it is difficult to compare these results with those of other drugs because of methodological differences across studies. Based on a very small number of studies, behavioral and cognitive-behavioral brief interventions for drug-use disorders do not appear as promising as brief motivational approaches.

When assessing studies on brief interventions for drug use disorders, an important consideration is that most involve persons with diagnosed substance dependence rather than persons with patterns of nondependent but hazardous substance use. As a result, little is known about the effectiveness of brief interventions among less severe drug users. The fact that brief interventions appear to be effective for those who use marijuana heavily suggests that this approach may also be useful for those who use marijuana only casually.

THE PUBLIC HEALTH APPROACH WITH TRAUMA PATIENTS

Many trauma surgeons recognize that psychoactive substance use is a major concern in diagnosing and treating

trauma patients. However, because most trauma surgeons are not familiar with effective screening tests and brief intervention techniques, progress has been slow in identifying substance-related risks.⁶³ Given the prevalence rates of alcohol abuse and other substance use disorders in trauma centers, surgeons need an early intervention strategy that is feasible, efficient, credible, and effective in preventing future injuries. From previous experience, only a very brief screening and intervention procedure (from 10–40 minutes duration) is likely feasible in trauma settings because of time constraints and other contingencies.⁵¹

There are at least three reasons why the trauma center is an opportune setting for brief interventions. First, for many of these patients, particularly young adults and others lacking access to primary care, trauma centers and emergency departments are their only contact with the health care system. Consequently, interventions in these settings may be the only opportunity for some patients to obtain preventive services. Moreover, these are the main settings where patients are encountered during a “teachable moment” after a traumatic injury. Although primary care patients with substance use disorders have received the most research attention, trauma patients often mirror the demographic and personality characteristics of the population most at risk. This is particularly true of young male subjects who have personality traits such as sensation seeking, aggression, or sociopathy.

Second, brief interventions should be effective for many trauma patients who use psychoactive substances—particularly alcohol. The literature indicates that young adults respond as well as other age groups to brief interventions, with no evidence that effectiveness varies by type of provider or the setting where screening, brief intervention, and referral are conducted.⁵⁰ As noted previously, there is greater scientific support for alcohol screening and brief intervention than for drug screening and brief intervention. Still, there is no reason why trauma patients with drug-related injuries should not also receive appropriate screening tests, brief interventions, or referrals for further evaluation. Most trauma patients who are drug users, use marijuana. This type of drug use appears to respond well to brief interventions.

Third, screening and brief interventions are likely feasible, even in busy trauma center conditions, provided that procedures are adapted to the situation so that the delivery mechanism is in place. For example, Rhodes et al.⁶⁴ evaluated a computer-assisted procedure for screening and health promotion in the emergency department. They found that the majority of patients disclosed important health risk information (including problem drinking and drug use) and were more likely than a control group to remember receiving advice on what they could do to improve their health. It was concluded that computer-assisted screening could easily be used in the emergency room while patients wait for treatment as a way to promote good health and identify at-risk patients for specific interventions. Other feasibility research⁶⁵ indicates that screening for alcohol and other substances can be

either conducted with equal effectiveness by on-site personnel or outsourced to health educators, depending on the needs and demands of the health care provider.

CONCLUSION

Trauma centers present a unique opportunity to implement screening and brief interventions. The prevalence of substance use disorders among trauma patients is high. The elements of a public health approach are available in this medical setting and, if applied, can lead to improved prevention services for these patients. The target disorders have sufficient conceptual clarity to allow reliable measurement. Moreover, the natural history of the target disorder and the underlying risk factors and populations at risk are well understood. Existing screening tests can be implemented through trauma centers at an opportune time—when the patient's medical consequences evoke a teachable moment. Screening tests are reliable, inexpensive, and easy to administer, and brief interventions are available, effective, and feasible within the trauma environment.

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Brief Interventions for Hospitalized Trauma Patients

Chris Dunn, PhD, and Brian Ostafin, PhD

Substance abuse is one of the most prevalent comorbid conditions among trauma patients. Research has shown that injury can be reduced when brief interventions are provided to trauma patients

who are hospitalized for substance abuse. This article presents data from a Level I trauma center that provided brief interventions daily over a 5-year period. A generic model for brief intervention is de-

scribed, along with concrete details of this addiction intervention service.

Key Words: Trauma, Brief interventions, Alcohol, Substance abuse.

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Substance abuse is one of the most prevalent comorbid conditions among trauma patients. Alcohol and other drug use are involved in a substantial portion of traumatic injuries.¹ As many as 36% of hospitalized trauma patients have blood alcohol concentrations (BAC) higher than 100 mg/dL,² and up to 23% are under the influence of cocaine or methamphetamine.³ Further, screening positive for alcohol and other drugs at admission is associated with an increased likelihood of future trauma.^{3,4} Background and basic principles for providing brief substance abuse interventions in trauma centers are described elsewhere.^{5,6} Since our initial work developing the principles for conducting brief interventions in trauma centers began, we have conducted nearly 3,000 brief interventions with hospitalized patients at Harborview Medical Center, a Level I trauma center. This paper distills our experience to provide a generic model for brief substance abuse intervention along with operational details of our Addiction Intervention Service.

On-site Inpatient Interventions Versus Referrals to Off-Site Treatment

Why should substance abuse be addressed during trauma hospitalization? Why not simply screen all trauma patients for substance abuse and refer screen-positive patients for treatment after discharge? Unfortunately, numerous barriers

may prevent all but 5 to 10% of patients who need it from entering substance abuse treatment.⁷ In some states, qualifying for public funding may take months. Some patients will be discharged to a skilled nursing facility or to jail; others will be prescribed narcotic analgesics, which are forbidden by many substance-abuse treatment agencies. Perhaps the greatest barrier to entering treatment is motivation; many patients simply do not believe they need help.³

Gentilello et al.⁸ showed that hospitalized trauma patients can be forced into substance-abuse treatment. A patient's family members or employers, when counseled to enforce certain negative consequences if the patient refuses help, can directly intervene. However, this type of intervention is logistically difficult because it requires quick action. A counselor from the trauma center must locate, contact, and then meet with members of an intact social support system, which not all patients have. Patient confidentiality and autonomy are also serious concerns. Without the power to enforce consequences for refusing treatment, it is difficult to persuade patients to get help and almost always results in the patient arguing against the need for change with statements such as "I don't drink every day; I can take it or leave it; I can quit anytime I want."

Brief counseling interventions derived from motivational interviewing (MI)⁹ offer a promising strategy for rapid, cost-effective treatment. MI is an evidence-based psychosocial treatment for substance abuse disorders that focuses more on preparing patients for change than on prescribing immediate action.

Efficacy of Brief MIs

Brief MIs (usually ranging from one to four sessions) are among the most effective and least expensive of over 30 alcohol treatment modalities.¹⁰ Although there are differences between specific MIs, usually all have several common elements, such as 1) offering patients individualized information about their BAC results or Alcohol Use Disorders Identification Test (AUDIT) results; 2) emphasizing individual responsibility for change; 3) offering advice to change; 4) offering options for taking action; 5) enhancing the individ-

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ual's self-efficacy for change; and 6) conducting the intervention in an empathic style.¹¹

For over 20 years, studies of brief counseling interventions in various nontrauma medical settings have reported decreases in self-reported drinking and improvements in liver function tests and rates of other alcohol-related morbidity.¹¹⁻¹⁶ Recently, four studies have investigated the efficacy of MI with trauma patients.

Monti et al.¹⁷ found that a single MI session in the emergency department (ED), versus standard ED treatment, reduced alcohol-related injuries (50% vs. 21%) and moving violations (23% vs. 3%) for up to 6 months after injury. Gentilello et al.⁷ found that a single 40-minute bedside session reduced weekly drinking (1 year after injury) by 22 drinks compared with 7 drinks for control subjects. Additionally, there was a 47% reduction in hospital readmission in MI patients compared with the control group, with up to 3 years follow-up during the first 3 years after injury. Longabaugh et al.¹⁸ reported a reduction in alcohol-related negative consequences (for up to 1 year) after adults in the ED received one session of MI during initial treatment and one booster session a week later, which increased the effect of the initial session in the ED. Hungerford et al.¹⁹ provided a one-session MI to ED patients. This resulted in significant reductions in alcohol-related harm, self-reported drinking, and alcohol-dependence symptoms.

How Change Occurs

Why do substance abusers continue to drink or use drugs if it causes unpleasant consequences? Alcohol-dependent patients may typically associate positive outcomes with alcohol use rather than negative ones.²⁰ Drinkers who are unable to form associations between their drinking and negative emotional experiences are at a higher risk for problem drinking.²¹⁻²³ Consequently, these at-risk drinkers may need more time than most to reflect on their punishing experiences.²³ MI may be particularly well suited to help the substance abuser explore negative consequences in a non-judgmental style. When the interventionist directs the patient's attention to the relation between alcohol use and current suffering, the patient can spend more time reflecting on the injury experience and less time defending a drinking lifestyle.

Instead of prematurely advising patients on how they should change, MI focuses primarily on preparing them for change by exploring why they might want to change.²⁴ Research on health behavior change indicates that the probability of healthy change varies according to each patient's stage of readiness.²⁵ In the earliest stage, people recognize few if any negative consequences of drinking or using drugs. With these people, the clinical task is to create ambivalence about change by helping them to become more aware of current or future harm: "May I give you some information? When you were admitted, your alcohol level was 0.23, and we have

learned that most of our stab-wound victims are intoxicated at the time they are stabbed."

As doubt arises about the "okayness" of the status quo, ambivalence is created between motivation to continue drinking and motivation to change. Nowhere are the negative consequences of substance abuse more palpable than in a trauma center. The motivational task at this stage is to resolve the ambivalence by thoroughly discussing the pros and cons of change. Patients in later stages of readiness are already motivated to change. They need to publicly commit to a plan of action and try to stick to it without relapsing. The emphasis shifts at this point from discussing the *why* of change to discussing the *how*: "What options make the most sense to you for quitting drinking? Alcoholics Anonymous (AA)? Professional treatment? Quitting on your own?" Although MI avoids arguing or persuading, the interventionist still has an ethical duty to suggest various courses of action:⁹ "May I state a concern I have? I know it's important to you to quit on your own, but your chances of success go up if you use treatment and AA."

GENERIC OUTLINE OF INPATIENT INTERVENTION

The sequence of five clinical tasks shown in Figure 1 is a guideline for trauma center interventions. This sequence is usually completed in a single bedside session lasting 20 to 30 minutes.

Raise the Topic

The first task, raising the topic and getting started, is difficult. The interventionist must start a conversation about drug and alcohol use in a setting where patients expect to discuss surgical matters only. Furthermore, patients often begin by trying to convince the interventionist they do not have a drinking problem. After the interventionist reassures the patient that the purpose of the conversation is not about forcing change, the focus shifts from whether or not the patient has a problem to what the patient likes and dislikes about drugs and alcohol: "I'm not here to push you into changing anything you don't want to change, just to help you think through what options make the most sense for you." Another helpful strategy is to first allow the conversation to move toward the patient's more immediate concerns. Often there are issues such as pain, self-care after discharge, or work and financial worries.²⁶ Listening to these primary concerns, acknowledging their importance, and summarizing their possible solutions increases rapport and trust. Spending 5 minutes here can result in the patient exploring the *why* of change more openly during the next 15 minutes.

Look at Substance Abuse from the Patient's Perspective

The second task is to elicit and understand the patient's views on alcohol and drug use, reasons for using, and any perceived negative consequences of use. This will help the patient see the big picture—how substances fit into daily

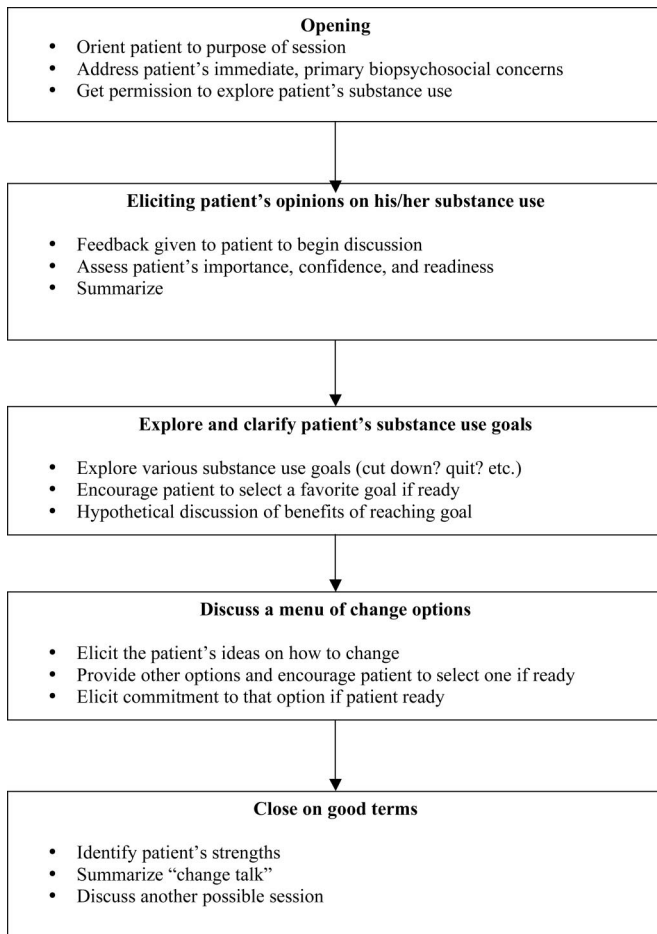


Fig. 1. Sequence of clinical tasks for the inpatient intervention protocol.

routine in both positive and negative ways. One method is to report BAC test results (if available) along with the behavioral and cognitive effects associated with that BAC level. Liver test results can also be used as an opening topic. After providing this feedback, the interventionist can ask, “What do you make of that?” This may encourage the patient to think about the negative consequences associated with alcohol use. Patients often contest the accuracy of laboratory toxicology tests. In these cases, it is important that interventionists avoid a potential debate by conceding the possibility of human error. Our experience is that many patients who challenge the validity of toxicology laboratory results often want to quit drinking or using anyway. Another way to elicit the patient’s views is by exploring the importance of change and the patient’s confidence level: “I’m wondering how important it is to you to reduce or quit drinking?” and “If you were to decide to quit drinking, how confident are you that you would be successful?”

Clarify Patient Goals

The third task is helping the patient clarify goals regarding substance use behavior. Often, the only substance use

goals the patient has considered are those that have been offered by concerned others (usually unsolicited). A discussion in which the patient is not put on the defensive can encourage the patient to set attainable personal goals. These goals vary widely among patients. Some may want to quit alcohol and drugs completely and permanently; others may want to quit specific drugs and cut down on others; some may want to quit for only a specified time period before trying less harmful ways of drinking. Another category consists of patients who are just not ready to decide. In these cases, it is useful to discuss goals hypothetically: “If you were at a point in your life where you were ready for a change, what changes would you want to make?” Interventionists inform all patients that abstinence is their safest option. If they will not commit to this goal, then the interventionist discusses strategies to reduce harm from alcohol and drug use.

Discuss Options for Attaining Goals

The fourth task is to discuss a menu of change options to assist the patient in reaching personal goals. This optimistically conveys to the patient that there are many ways to solve substance abuse problems. Presenting a menu of options may also reduce defensive reactions by not forcing an all-or-nothing decision. For any given behavior change under discussion, this menu should include a continuum of options with broad motivational appeal to those who are not committed to change and to those who are very committed to change. For example, a menu of options for drinking might include doing nothing, experimenting with cutting down for a limited period, quitting without outside help, or quitting with professional treatment or AA. This negotiation process follows an elicit-provide-elicite cycle.²⁷ First, the interventionist elicits from the patient what the patient is already thinking about doing to change. Next, the interventionist provides a menu of options, and then elicits the patient’s reactions. Most advice by the interventionist is made only in response to the patient’s ideas. This helps to prevent vacuous agreement or further resistant statements and pushes the patient to seriously consider change.

Close on Good Terms

The fifth task involves summarizing statements the patient has made in favor of change and acknowledging any agreement reached.²⁸ Without condoning substance abuse, the interventionist assures the patient that ambivalence is normal and everyone experiences it as they move toward lasting change. Conveying acceptance of ambivalence, rather than impatience with inaction, seems to bring about change more quickly.

OPERATIONAL ISSUES FOR AN ADDICTION INTERVENTION SERVICE

The Gentilello et al.⁷ study at Harborview Medical Center convinced the hospital to implement brief interventions with trauma patients as a daily hospital service. The Addic-

tion Intervention Service began in 1998 using the same psychologist who had performed interventions in the randomized trial (C.D.). At first, only 20% of the patients who received an intervention were referred by hospital staff; the other 80% were proactively identified through screening by the interventionist. The number of referrals increased as hospital staff became more familiar with the Addiction Intervention Service. Now, 5 years later, 75% of all patients receiving interventions are referred to the Addiction Intervention Service by hospital staff including trauma social workers, psychiatrists, nurses, residents, and medical students.

In addition to screening and providing evidence-based brief interventions, the Addiction Intervention Service also provides “curbside consults” to trauma center staff, involving discussions of addiction and specific intervention strategies. The result is an increase in staff morale. Many on the staff had become pessimistic from years of treating the injury without addressing the primary cause of the injury, and they are grateful to see the problem being directly addressed.

Screening Patients

Because of the reality of limited resources, it is best to minimize screening time to maximize the time spent providing interventions. Although laboratory toxicology screens are less sensitive and specific than standardized screening questionnaires used in randomized clinical trials, our study revealed that they are a more time-efficient screening method. However, in a substantial number of trauma centers that do not routinely order BAC or urine toxicology screens, the intervention service must rely on staff referrals and screening questionnaires to identify patients. We caution against using any version of the Michigan Alcoholism Screening Test,²⁹ because the wording in a number of questions may elicit defensiveness in patients (e.g. “Have you ever neglected your . . . family for two or more days in a row because you were drinking?”). The AUDIT may be a better screening tool in medical settings because the questions are posed in a more general and neutral tone. Additionally, the AUDIT generates normative feedback about the incidence of alcohol-related problems, which can be a starting point for patients to begin thinking about behavior change.³⁰ Nurses can administer the AUDIT and convey the results to the interventionist, or the interventionist can administer the AUDIT directly to patients. We have found that drug use can be assessed with a single question from the Addiction Severity Index, “How many days out of the past month have you used any nonprescription drugs such as cocaine or marijuana?”³¹

Interventionists

Trauma centers are well staffed with a variety of medical and psychosocial clinicians able to learn and implement the brief intervention model. At Harborview Medical Center, the chief of the intervention service is a faculty psychologist who also trains psychiatry and psychology residents to conduct interventions. This not only increases the number of patients

receiving interventions, but also provides valuable instruction early in residents’ training. Later, residents can then use these skills to perform interventions throughout their careers. Other trauma centers use nurses, social workers, pharmacists, and substance abuse specialists to perform interventions. Studies have demonstrated that interventionists do not have to be substance abuse treatment specialists for substance abuse interventions to be successful. However, regardless of the training background of the interventionist, brief intervention programs should adhere to a standardized protocol, which usually uses a patient-centered counseling style.³²

Confidentiality

The issue of confidentiality is critical in substance abuse interventions for a number of reasons. In many states, insurance companies can deny medical coverage for injuries sustained while intoxicated.³³ Additionally, a federal confidentiality law (42 CFR Part 2) requires that providers of substance abuse services keep clinical notes separate from the patient’s medical record.³⁴ Trauma centers can keep intervention notes in a locked location separate from the medical record and require a special patient consent for release of this information to other parties. (Note: This includes police, attorneys, etc., not just providers.) If interventionists chart electronically, a password should be established to prevent other hospital staff from viewing the substance abuse notes. Some surgeons argue that drawing a BAC is required for medical management of injury.³⁵ However, access to those screening results is not protected by 42 CFR Part 2.

Number of Patients Receiving Interventions

In 1 year of full-time employment, an interventionist can screen about 2,000 patients and provide 700 brief interventions. Patients may be seen in ED observation wards, on the surgical wards, and in clinics. A typical day might include ward rounds, with or without the trauma team, gathering BAC from the previous day’s admissions, administering screening questionnaires, providing interventions, consulting with hospital staff, tracking patients who are still too ill to receive intervention, and tracking service data. Hospital discharge seldom requires delay until the interventionist can see the patient. Nevertheless, because of operational and logistic factors (language barriers, brain injury, and sedation) approximately 20 to 30% of patients are discharged without being approached by the interventionist.

Brief Interventions and Alcohol Dependence

The severity of substance abuse problems among trauma patients varies widely from mild to severe. The Institute of Medicine³⁶ and American Society of Addiction Medicine³⁷ recommend matching the intensity of treatment to the severity of the problem. Accordingly, a brief intervention would be the best match for a patient who is not dependent on alcohol, whereas dependent patients would be best matched to inpatient, residential, or long-term outpatient care. If all trauma

patients were ready, willing, and able to engage in the appropriate level of treatment, this is how treatment matching should occur, and we could adhere strictly to this formula. Unfortunately, only 5 to 10% of trauma patients meeting diagnostic criteria for dependence seek this intensive level of treatment in the year after injury.⁷ A brief intervention may be all the treatment these patients are likely to receive in the foreseeable future. Diagnostic interviews during the Gentilello et al.⁷ study revealed that patients who met criteria for alcohol dependence still benefited from a brief intervention, despite requiring more intensive treatment, which they were not willing or able to access. For these reasons, we recommend providing brief interventions to all substance abusing trauma patients, including those who are dependent and those who do not meet criteria for dependence.

FUTURE TRENDS

Previous studies of trauma patients who received brief interventions have shown that substance abuse decreases markedly for several months after injury but then returns to preinjury levels as patients recover from their injuries and the memory of the experience fades.³ As patients recover physically, their motivation to abstain or limit substance use may diminish. Intermittent booster sessions over a period of months after injury may help to maintain changes that patients resolved to make during their hospitalization. Research indicates that outpatient booster sessions delivered within a few months of discharge do prevent or delay the return to problem drinking.¹⁸ We believe that bedside interventions are a good place to start, but a high-quality psychosocial trauma service should extend beyond the bedside and address a wider range of patient concerns. Zatzick et al.³⁸ has documented that trauma patients have multiple psychosocial concerns limiting their ability to function for up to a year after injury. A pilot study revealed that skilled case management over the 6 months after injury can reduce both drinking and symptoms of posttraumatic stress disorder.³⁹ As our knowledge of the psychosocial impact of severe injury grows, our psychosocial services should expand accordingly.

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Session 2: Discussion

J Trauma. 2005;59:S94-S100.

The editors of the proceedings prepared the following summary of participant comments made during the session.

Larry Gentilello

It's great to hear that these interventions are simple enough to be conducted in only a few minutes and that they provide something distinct from what we usually think about when we consider treatment. It's not 28 days at Betty Ford. Tom Babor has cited 40 randomized trials; 20 using high-quality methods. Isn't that enough data or do we actually have to reprove that this works in a trauma center by doing 40 studies in a trauma center? How well can you translate the results from those 40 studies and say they'll also work in our clinical environment?

Carl Soderstrom

Studies in many clinical settings, involving different population groups in the United States and in other countries, clearly show that intervention works. Until Larry's [Gentilello] seminal study, intervention studies in trauma-care settings did not exist.

Thomas Babor

How many studies does the FDA require to market a drug that may have very severe side effects? It's basically two positive studies, isn't it? When we're talking about science, there's never enough information that provides absolute certainty, but for behavioral intervention that seems to have very few side effects, there is a good deal of evidence that when implemented correctly, interventions will have predictable positive effects. I think that's sufficient evidence to proceed in a limited way toward clinical practice.

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Carol Schermer

There may be a higher prevalence of patients with substance use problems in trauma settings than in medical settings where interventions have been studied. However, I don't think drinkers in trauma settings would respond any differently. There is no need for multiple efficacy studies in trauma centers. As for screening instruments, I like the AUDIT because it detects at-risk drinkers early, and Carl Soderstrom's research shows that the CAGE is more likely to identify dependent drinkers. I'd like to ask Carl Soderstrom and Tom Babor which instrument they feel is best for trauma surgeons' use.

Thomas Babor

We could proceed scientifically by reading the literature and considering the sensitivity and specificity of various instruments. Who will be using it? What do people feel comfortable with? Is there a personal reason to use it? Ideally, you should choose the screening instrument scientifically, but there are enough screening tests on the market to satisfy a variety of different preferences and needs. It's a very positive development that we have a variety of technologies to choose from and all lead to a positive effect. Generally, you want to find out how much people are drinking and do it in a systematic way. Often, clinicians think they know exactly what to ask. But in many cases, a structured set of questions would be better than a clinical interview. One way to ask a question is "*You don't drink, do you?*", as opposed to "*How many drinks do you have on a normal occasion?*" You'll get completely different answers to these questions. It's better to proceed with a structured interview to get reliable, consistent answers.

Carl Soderstrom

My study showed that the CAGE and the AUDIT performed quite well, but the brief MAST performed poorly, particularly among women. We were not getting the recruitment rate that we thought we should be getting. So, we went down to the trauma bay to see what exactly was going on. When a patient is in pain and confused and disoriented by the bright lights of a treatment room, it is important to phrase questions appropriately. Instead of asking "*Have you been drinking?*," which tends to lead to an answer of "*No*," we revised the procedure to ask the patient "*Are you a drinker?*" If the answer was positive, we called in the study recruiter. The success of screening efforts depends a great deal on the setting and who is asking the questions. Rather than worry

about using a particular screening instrument, the important thing is to screen patients.

Anthony Meyer

I think what you are describing is the “screaming” test. [Laughter.] Many physicians and others who have principal roles in health-care delivery are not ready to adopt screening and interventions for substance-use disorders. Why not? Because we are asking them to do something different, for which they have minimal training. Some are skeptical, possibly because of their own drinking habits or their discomfort in implementing behavioral interventions. Others want stronger evidence of efficacy. Skeptics can always find data to support their points of view. So, when a physician treats the same patient three weeks later for another alcohol-related injury, this will definitely increase skepticism. Even if it’s only one of the 10 intervention patients, and five of those had a positive effect, the one the skeptic will remember is the one who comes in again with a new injury.

William Schecter

I work in an inner city hospital. Usually, I don’t have to ask screening questions because my patients absolutely reek of alcohol when they come in for treatment. In the past, I have often said something to my patients regarding their drinking behavior, a sentence or two, because I feel that’s what a doctor should do. But, not having my finger on the pulse of this literature, I assumed that I was wasting my time. I’m glad to hear that there’s actually evidence that interventions do help some patients. Is there any evidence that brief interventions work with drug users, particularly injection-drug users?

Chris Dunn

I’m not aware of any brief intervention studies involving drug use.¹ What I have noticed is that the interventions at Harborview have spread from trauma patients to nontrauma patients. The medicine department calls all the time and asks me to see heroin addicts with abscesses or an infection of their heart valves. We don’t know if it helps, because there is no follow up. Even after being the interventionist on Larry’s [Gentilelo] successful study, I still walk out of the room shaking my head not knowing if it’s enough.

Tom Babor

We’re talking about a different goal. Most patients we see are not the ones who reek of alcohol, but the ones who have screened positive because they are drinking at risk. Those who drink a six-pack a day or even two or three drinks a day, are good candidates for an intervention to cut back on their drinking. If they are reeking of alcohol, then most likely

they started drinking in the morning, and they have a serious alcohol problem. For these patients or those who show signs of IV drug use, the intervention most likely would focus on getting them to consider a referral for further evaluation and treatment. Brief interventions, motivational interviewing, are ideal for that purpose. The goal is not to focus on getting patients to admit their use of drugs or alcohol, but to refer them for treatment.

Ronald Stewart

I have several questions. How are intervention programs implemented taking into account the range of resources that might be available at different hospitals? Who should be doing the intervention? How much is the cost? What would be optimum? What would be a barebones minimum? If you guys were setting this up right now, how would you do it?

Chris Dunn

The research literature indicates that a wide variety of people who are not trained substance-abuse counselors can successfully provide brief interventions. Trauma centers do not have money to hire additional staff, so we use any staff that is available. Choosing the right type of person to implement interventions is like trying to choose the ultimate screening instrument. Anyone can perform interventions. It doesn’t have to be motivational interviewing. If the interventionist is respectfully concerned, they’ll be effective.

Thomas Babor

A number of steps are necessary to have an effective screening intervention and referral program. First, you need to be able to get a large proportion of the patients screened, and logistically, you need to get the positive cases identified and prepared for the intervention. Highly trained and highly paid medical staff should not be used to screen patients. It’s more of a question of the system of care taking on that responsibility. It doesn’t matter who does it. In fact, in some cases, it’s better to have less trained people perform screening. I’ve spent a good deal of time developing structured psychiatric interviews, and what we found is that a trained research assistant can come up with much more accurate diagnoses of a large cohort of patients than a trained psychiatrist who uses a clinical interview. Why? Because the trained research assistant is following the instructions and systematically interviewing every patient. The same goes for screening tests. By following a routine procedure, support staff can perform screening, compile scores, and get the information to clinicians who will do an intervention. This is probably the most efficient way to do it. But, it depends on the team and the way they want to divide up the responsibilities. An alternative would be to carve out the whole procedure as Dennis Kelso has done with the system that he set up in California—have people from outside the agency come into a clinic, trauma center, emergency room, or other health-care setting, and take responsibility for the screening. After the staff are

¹A study published after the conference indicates that brief interventions for cocaine and heroin might be useful. Bernstein J, Bernstein E, Tassiopoulos K *et al.* Brief motivational intervention at a clinic visit reduces cocaine and heroin use. *Drug and Alcohol Dependence*. 2005;77:49-59.

trained, they know what's going on. The results of the screening and the intervention are put in the medical record, and the physicians and trained staff reinforce the intervention. So there are a variety of different ways to do this, but the process has to be integrated into the trauma system—within the social network, the social system of the health-care team—rather than just having each individual on the team assigned a particular responsibility.

Susan Nedza

Chris Dunn remarked that physicians in training, including psychiatric residents that rotate through his service, do not have much exposure to addiction medicine. In the past, training in emergency medicine included time on an inpatient psychiatric unit, but now, due to budget cuts, many facilities no longer offer inpatient detox. How many conference participants have spent time on a psychiatric ward or gone to an AA meeting as part of their training? Chris, would this be useful for those of us who could be doing this kind of screening?

Carl Soderstrom

For training purposes, how many people in this room have been to an AA meeting? (*About 40% of the people in the room raised their hands.*)

Chris Dunn

This is a great question. All the residents who round with me don't have addiction expertise and are almost never in recovery from addiction themselves, so they feel that they are at a disadvantage. Some patients think, erroneously, that only someone in recovery can help them, because that person has had similar experiences. Trainees can quickly get around this hurdle, especially if they make it clear that patients are the ones responsible for describing their substance use. We send our medical students at the University of Washington to two AA meetings, a couple of years apart, and ask them to write down their observations. This is fascinating reading material. AA is friendly to health-care providers who want to visit meetings. They like nothing better than to have people there who are interested in learning.

Bill Schechter

Does AA view alcohol misuse as a disease or a moral problem?

Chris Dunn

What AA members say versus what the AA basic text says is often different. The text is based on the first 100 people who joined AA, all of whom were men and heavy-duty drunks. These views may not represent the views of the million or more people who now belong. Bill Wilson, the founder of AA, has discussed this issue with the medical community and I believe there was a sense that science would one day understand this condition and declare it a disease.

People in recovery describe their experiences differently than what is described by academics. However, both descriptions have a lot in common. So, I don't think there's a lot of inconsistency.

Thomas Babor

Let me make a quick observation regarding AA meetings. It's a good idea to send students and professionals to these meetings so they can become familiar with AA and how it works. It's also an opportunity to observe people who are in recovery. Other good learning environments would be to observe patrons at a local bar or people at cocktail parties. How many of these people are walking out after two or three drinks, slightly impaired? They are never going to be alcoholics. They're never going to be in recovery, but they are at risk of substantial alcohol-related problems over a period of time. Our focus should be on reducing that exposure. The problem is that if people have an AA mindset or an addiction disease mindset, then that will be their only focus. The problem is much larger than "alcoholism."

Michael Sise

Tomorrow, I'll be presenting my experience in implementing screening and brief intervention in trauma centers. Most of the surgeons in this room are where I was four years ago when I got dragged very reluctantly into this whole behavioral health thing. Even though the literature supporting the efficacy of screening and brief interventions is compelling, I don't think surgeons are the ones to do it, and nurses are already overburdened. A health educator seems like a good choice to me. Our challenge at this conference is to determine how behavioral health folks can teach surgeons about this in a way that motivates us to embrace it?

Carl Soderstrom

Chris [Dunn], since you have put together a curriculum, would you address Mike [Sise's] question?

Chris Dunn

In a study of internists at a VA hospital, we told them we were conducting a study on patient communication—we didn't tell them we were studying alcohol use. Then we placed alcohol-screening data in plain view on the outside of the chart like, "Your patient had a 0.25 BAC last week. All four CAGE items are positive. The patient meets the criteria for alcohol abuse or dependence." After this, we tape-recorded internists, with their permission, to see how often they raised the topic of alcohol use. In analyzing the taped material, we found that instead of scolding patients, the internists were asking their patients a lot of questions and talking a lot, but using a friendly and concerned tone of voice. The transcripts show that these internists were actually quite skilled. My sense is that physicians have a lot of practice in skirting around delicate topics that are medical in nature, but aren't trained or have little practice in talking personally about

psychosocial topics. Family physicians seem to have more experience along these lines. I think we should test a couple of abbreviated styles of intervention training for physicians—something that can be done quickly. There's good reason to believe this can work.

Ann Mahony

Chris [Dunn], in structuring your brief intervention, do you work from the assumption that essentially everyone is a hazardous drinker whether their BAC level is 0.10 or 0.30?

Chris Dunn

No, it doesn't matter to me whether I know the patient is a hazardous drinker or not. For example, if they have fallen off a wall and have a high BAC I say to the patient, "You were on a wall with a high BAC." I don't care about categories. I'm trying to change behavior. Even if I incorrectly categorize a full-blown alcoholic as a hazardous drinker, it doesn't matter because "change" is up to the individual. I don't talk differently based on categories. I express concern with any patient who has a high blood alcohol level. We don't need to know exactly where a patient's condition falls on the continuum of severity to talk about the problem.

Ann Mahony

So you just don't make any distinction, you essentially go in with the same approach.

Chris Dunn

They never ask for an expert's opinion, which I probably wouldn't have anyway without spending an hour asking them about quantity, frequency, age of onset. But without knowing that, I'm concerned and that's good enough to go and have a meaningful conversation, and according to Larry's data, cause some change.

Ann Mahony

Do people ever ask if they need a referral?

Chris Dunn

Sometimes. People do ask for treatment. And once they really want to go into treatment, they're good at it. I have walked into a room where the patient is already on the phone calling the methadone clinic or calling their mom to get money. This doesn't mean that we don't refer people, but I don't spend a lot of energy and time on referrals because our data show that less than 10% will go into treatment. I spend more time asking patients to form an argument about why they should change their drinking because it looks like that is what works. If we had treatment available on demand, then that would be different.

Charles Lucas

Routine brief intervention at the bedside during teaching rounds is just as appropriate with drug addicts as it is with

alcoholics. Our experience is that patients who have used all of their main lines and are skin popping, the chance for conversion is very slim. In patients over the age of 40 who are still mainlining, or actually have some peripheral veins, there is a better chance the patient will get off of the needle. In patients over the age of 40 who have a Dacron graft in place and are told they are going to lose their leg if they go back to shooting, the chance of success rises to over 50%. Patients, especially those over the age of 40, are often using cocaine socially, just like how we may have a good wine when we go out for dinner somewhere tonight. The success rate for intervention is high if these patients require hospitalization for injury caused by their use of cocaine.

Gill Cryer

The studies presented here are very impressive. My first question is "Does the data show that patients decreased their drinking enough to put them below the hazardous drinking range?"

Thomas Babor

Many studies report the drinking limits physicians recommended to patients. Those who are not dependent should be given a choice about whether they prefer to choose a period of abstinence or moderate drinking. Most will choose to decrease their drinking. The next step would be to negotiate a limit that is reasonable and responsible. The standard limits used most frequently are those determined by the US Department of Agriculture/National Institute on Alcohol Abuse and Alcoholism. These limits are pretty low—for women, no more than one or two drinks on any given occasion and no more than seven drinks a week total; for men no more than two or three drinks per occasion and no more than 14 drinks a week. In addition, they should drink no more than four or five days a week. So, there has to be at least a few days of abstinence during a week. People who don't exceed two or three drinks and have a few days of abstinence a week are unlikely to become dependent on alcohol or to be impaired enough to have an accident. These are the proposed limits. Some studies have reported that compared with the control group, from 5% to 15% more of the intervention group drink within recommended limits. However, not all studies report this outcome measure—many report only average reductions. There are five or six different outcomes reported, each with a slightly different meaning in terms of how intervention is working. Certainly, the proportion of people who come down to a safe drinking limit is an important outcome measure and it should be reported.

Gill Cryer

I have a follow-up question. You nice researchers have approached me in my room and talked to me about my goals regarding alcohol use, and then you call me six months or 12 months later to see how I'm doing. Being the honest drinker that I am, and also wanting to please you nice researchers,

how do you know that the data I give you is accurate? I'm not going to tell you that I drink more than I did before, unless I want to make you look like you have failed or that I have failed.

Tom Babor

There's been a lot of skepticism about self-reported alcohol consumption, particularly in treatment studies, but also in intervention studies where there isn't as much incentive for patients to distort their drinking behavior to please the investigator. A number of techniques have been developed to enlist patients to collaborate with the investigator, from a scientific perspective, to give honest information. In general, if patients know they're in a scientific study and are made aware of other ways the information they give can be checked for accuracy (e.g. a saliva test), the chance of distortion is not that great. We only suggest to the patient that there are various ways of checking the accuracy of self-reported information. As you know, a saliva test is not very accurate. We don't tell patients how valid a particular test is. Generally, self-reported information is more valid than biological information. When people are given an honest explanation of the purpose of the questions, that they are part of a scientific study, the distortion is relatively low. There are also a number of different ways to check the validity of self-reported information, which increases our confidence in the data. Distortion does occur, but I don't think it's significant enough to invalidate the conclusions.²

Peter Monti

I have two comments. First, study results from Brown University, published in the 2003 edition of *Journal of Addiction*, suggest that a brief intervention can be effective with heavy-duty cocaine abusers, particularly as measured by the length of time that they're willing to stay in treatment as a result of having gotten that brief intervention. As so much of the treatment literature is based on the amount of time people stay in treatment, we take this as a very good sign. My second comment. I think this discussion has focused entirely too much on the notion of disease and illness and diagnoses. Our purpose here is to find ways to reduce harm, rather than to find cures for illness or disease. That's not to say that the medical model cannot be useful. I just think we are missing the boat if we look only at the medical model. One of the most telling slides that I've seen is one Carl [Soderstrom] and I have used in presentations over the past couple of years. It is a picture of two livers—a heavily diseased, a sclerotic liver and a very healthy liver. I can only assume that he didn't show them today because he wasn't presenting his dog and pony show. The healthy liver was the liver of a person who was in the trauma center. The diseased liver was from a

²For an introduction to this literature, see Babor TF, Steinberg K, Anton R, Del Boca F. Talk is cheap: measuring drinking outcomes in clinical trials. *Journal of Studies on Alcohol*. 2000;61:55-63.

chronic alcoholic, not the kind of person that we're generally talking about in these kinds of situations. I'd like to hear what the panel has to say about this observation.

Thomas Babor

Medicine is undergoing a shift in understanding about the role of behavior in health and disease. Since we've conquered, for the most part, many serious infectious and communicable diseases, and are making progress with chronic diseases, the next frontier is behavior. Some estimates attribute as much as 50% of the burden of disease worldwide to risk factors connected with behaviors—smoking, drinking, physical inactivity, and poor eating habits. When you combine all of these, changing people's behavior could alter the pattern of diseases. It's going to take a while to shift our emphasis from focusing exclusively on curing diseases to broadening the role of the medical community and the public health community in changing behavior, which contributes to this disease burden. We can continue to use concepts from medicine because they have worked so well during the last century. However, we are now combining those concepts with ones from public health. Although screening and diagnosis are terms that are sometimes relevant and applicable, we are trying to broaden our understanding of risk factors and behaviors, which are not necessarily disease conditions. They are something different, and we're just at the frontier of developing terminology, procedures, and new concepts to fit the reality that behavior is a key focus of interventions in health-care settings.

Carl Soderstrom

For the surgeons in the room, Peter Monti and his colleague, Bert Woolard, have been involved in cutting-edge research on brief interventions in the emergency department. Peter, in that slide, it's a normal liver only in that it doesn't look like it's diseased from alcohol, but it does have a bullet hole through it. [Laughter.]

Louis Ling

As an emergency physician, the trauma surgeons in the level-one trauma center where I work have not been committed to screening and brief interventions. It doesn't fit with our acute care model. Chris [Dunn] has said that anybody can do this—the psych service, a nurse, or a social worker. The lack of commitment in my trauma center comes from the fact that nobody owns this. Who takes responsibility? This is something we need to incorporate in our job descriptions.

Chris Dunn

For so long, chemical dependency professionals have "owned it," and we subbed it out. We referred to the specialist, and we bought into a specialist model. Now we're in a situation where specialist treatment works great, but it only penetrates a fraction of the market—the slots are all full. If we designate ownership to a specific group or type of pro-

professional, we might discourage other professionals—trauma surgeons, physical therapists, dentists—who can be effective doing this becoming involved. It should become a standard part of training for all health professionals so that patients would be hearing a unified voice. Patients would get a couple of seconds from the trauma doc, maybe a half hour accumulatively built up from the nurse who worked with them for three shifts before they're discharged, and maybe additional time with the physical therapist. Wouldn't this be great?

Thomas Babor

I think what Chris is suggesting is that everybody should own it. The healthcare team takes responsibility for getting the job done. We want 80% or 90% of patients screened. For those patients who are screened, we want to get a high rate of follow through—intervention, a referral, and whatever else it takes. The entire team needs to be trained, from the trauma surgeon to the trauma nurse. They need to know how scores will be compiled, how interventions will be delivered, and how the program will be reinforced. All this can be done in a variety of different ways. The main thing is that the team takes ownership and responsibility. For trauma surgeons, in addition to learning how to perform interventions and practicing with patients who screen positive, they need to support their team to ensure a systematic approach, as well as serve as an advocate in the community. We've got to really change the culture of medicine. All of us can be extremely influential by using our own personal experiences and these flexible models that have applied very well to health-care settings. We need to go out and sell it.

Louis Ling

I've learned from this session that doing an intervention is basically a skill. The American College of Surgeons is very good at teaching skills, like it has with its Advanced Trauma Life Support courses. A modular chapter could help people learn the skill of intervention, just like we learned to put in chest tubes and other similar skills.

Herman Dieneshaus

Tom Babor and I have been involved in the Institute of Medicine's study, *Broadening the Base of Treatment for Alcohol Problems*. This study recommends pairing screening and brief interventions in many community settings, including medical settings, where some individuals may require more intensive treatment. We made a fundamental mistake in this study. We thought that the social and economic benefits of introducing screening and brief intervention to medical settings were so obvious that most people would recognize this, and it would pay for itself. We need to carefully consider a business case model to determine the best way to pay for these services in trauma care settings. There are two models for providing screening and brief intervention in medical settings—the physician model and the physician extender model—each uses a different payment scheme. A business

case model would have to address questions like: How many patients are available for screening? Would universal screening be more efficient or effective than targeted screening? What billing codes can be used to cover costs?

Larry Gentilello

I don't believe that most trauma surgeons are ever going to actually be the primary providers of brief intervention. Clearly, their role is to advocate for the service and to see that trauma centers perform screening and provide support. Although I believe most surgeons do not have the time to provide these new services, we should be thinking about whose responsibility it is. Don Trunkey said that he hasn't seen a psychiatrist on his trauma service in 20 years. Sue Nedza stated that the psychiatrists she knows have had only one or two days training or no training in addiction. Trauma surgeons and people from the field of addiction need to collaborate to make these services happen in trauma centers. If this is left only to trauma surgeons, it will not happen.

Thomas Babor

Addiction treatment professionals, counselors, psychiatrists, and others are overwhelmed and preoccupied, justifiably, with end-stage addiction, or even middle-stage addiction. So they are primarily concerned with specialized treatment. We need a different approach to identify early the larger number of people who are at high risk or already have problems with alcohol and drugs early, particularly people who come into emergency and trauma settings,

In smoking cessation efforts, we've gone through several stages. The first one was. "Since we now have some interesting smoking cessation technologies, all we need to do is to get the American Cancer Society or the Heart Association to go out and train 100,000 trainers who can then train everybody else to do this, and there'll be no problems." We found out that this wasn't an effective way to disseminate these intervention technologies. What we have to do is first develop different models that fit in different settings. We have three or four models now, extenders versus professionals. We have training packages. We have ways that people can go into a clinic and train staff, not only how to do the screening and the intervention, but how to organize their office system to make sure that the job gets done. Practice settings that are connected with addiction professionals in universities where the technologies have been developed have a greater chance of success. Researchers need to be talking more with practitioners and introducing interventions into settings in a way that fits the demands, the responsibilities, and the roles in those settings. Certainly, trauma centers should be the prime targets for these new technologies because the prevalence rates are so high and the payoff appears so great.

Robert Schmieg

We know that alcohol and substance-abuse problems are serious problems, and we know how to identify and treat

these patients. Brief interventions can clearly be done. The problem is that we're doing these things in individual little centers. We're trying to persuade people to pick up the ball and run with it and motivate them, educate them, and persuade them. I don't think trauma surgeons are looking for ways to do this individually, but for ways to persuade administrators, fellow colleagues, and legislators to give us the resources to develop intervention programs. I've been looking for answers to those problems that I can carry back from this conference.

Thomas Babor

Robert, I encourage you to talk with Herman Diesenhaus about a federal initiative, which I think is going to have a significant impact on a statewide level. Peter Rostenberg worked to change a law in Connecticut that set a requirement for all health professionals, physicians, and hospitals to screen for alcohol use. Adherence to this requirement is not statewide yet. But, a couple of million dollars coming into a state is a good incentive for hospitals, primary-care associations, trauma clinics, and emergency rooms to hire the personnel to do this. Putting those resources into the system, I think, could have a dramatic effect in disseminating these technologies. It will be interesting to see what happens. The federal program, which is very innovative, is going to be a real test of how rapid change can occur in a health-care system.

Peter Rostenberg

To put into perspective how important this conference is, consider that alcohol is the third leading cause of death in America and injuries are the most frequent cause of deaths attributable to alcohol. In our hospitals, at least one out of five beds on medical floors is occupied by a patient with alcohol problems. In trauma services, it's 40% to 70% of admissions. And, in a community hospital such as mine, it's not just young people. We have old people with funny looking livers falling down, breaking their hips, and having very complicated hospital courses. It's a public-health problem—an epidemic that must be urgently addressed. If \$100 million can go for seatbelts, \$150 million should go to providing funds that will allow hospitals to establish intervention services with the knowledge that insurance companies will reimburse the medical costs involved.

Carl Soderstrom

On a personal note, I'd like to thank Dan [Hungerford] for organizing this conference because it's been long in the making, and it's just thrilling to be here. I'd also like to thank the morning and afternoon panelists. All of us, I think, have learned a lot. This is why we are here—to bring some knowledge to the table and to broaden the base of our own knowledge. Thanks to everyone.