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An evaluation of screening, brief intervention, and referral to treatment in emergency departments

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AN EVALUATION OF SCREENING, BRIEF INTERVENTION, AND REFERRAL TO TREATMENT IN EMERGENCY DEPARTMENTS

by

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AN EVALUATION OF SCREENING, BRIEF INTERVENTION, AND REFERRAL TO TREATMENT IN EMERGENCY DEPARTMENTS

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ABSTRACT

Alcohol use disorders are major national public health problems that are responsible for impaired health. The emergence of SBIRT (Screening, Brief Intervention, and Referral to Treatment) has potentially revolutionized the strategies used to reach the at-risk population of drinkers, specifically within emergency departments (EDs). Several studies have confirmed the efficacy of SBIRT as a viable ED intervention method. Improved study measures have included keeping appointments for treatment, decreased average alcohol consumption and heavy episodic drinking, reduction in health care costs, and reduction in subsequent DUls (Driving Under the Influence) and alcohol-related re-injury requiring emergency treatment. However, some studies reveal more mixed and sometimes complete lack of support. This manuscript brings this body of evidence together and introduces potential moderators to study results. These
moderators include ethnicity, alcohol severity, type of injury, setting disparities, adherence to clinical trial guidelines, and emphasis on referral to treatment. This paper also analyzes patient motivations and behavior change patterns, their potential effect on study outcomes, and suggestions to improve study designs.

SBIRT in EDs has provided a significant yet cost and resource-effective method of curbing alcohol misuse. Results from efficacy studies will hopefully mirror the SBIRT's evolution and resulting improvements to our nation's health.
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INTRODUCTION

The Issue

Alcohol use disorders are major national public health problems that are responsible for impaired health, harmful individual behaviors, and major economic and social burdens. Alcohol misuse currently stands as the third leading cause of preventable death in the United States today (Mokdad, 2004). Each year over 130 million people visit the nation's emergency departments (EDs) (CDC, 2012), and many of them have alcohol use disorders which may have contributed to their hospital visits.

The individual health effects of alcohol use have long been researched and documented. Immediate health risks stemming from binge drinking, or consuming excessive amounts of alcohol on a single occasion, can include unintentional injuries, violence, risky sexual behaviors, miscarriage, and alcohol poisoning (“CDC - Fact Sheets,” 2012). Over time, excessive alcohol use can lead to the development of serious chronic conditions, including neurological and cardiovascular problems, multiple cancers, and liver disease such as cirrhosis and alcoholic hepatitis (“CDC - Fact Sheets,” 2012).

Alcohol abuse can often lead to social problems such as unemployment, lost productivity, and family problems. It is one of the most prominent causes and
effects of homelessness ("Alcohol," 2012), and is a major factor for suicidal and at-risk behavior (Sher, 2006). Nationwide, alcohol disorders are responsible for over $223 billion annually in lost productivity, healthcare, and criminal justice costs (Bouchery, et. al., 2011). Prior research has demonstrated that a significant number of the injury-related visits in the United States are alcohol-related (CDC, 2008).

Traditionally, alcohol use interventions have been focused on two strategies, either universal prevention strategies aimed at those who have never initiated use or specialized treatment for those who have met the abuse or dependence criteria ("SBIRT History," 2010). For example, massive prevention efforts such as D.A.R.E. (Drug Abuse Resistance Education) and M.A.D.D. (Mothers Against Drunk Driving) have shared the public health spotlight for decades, and Alcoholics Anonymous has become an international standard in alcoholism treatment. These strategies cover the two "extremes" of alcohol use. However those who use alcohol at moderate or risky levels, who may be saved from transforming their use into a full-fledged alcohol disorder, are subsequently left out of the cycle of prevention, intervention, and treatment ("SBIRT History," 2010).

Before SBIRT was developed, emergency rooms would pay little attention to the alcohol and substance abuse issues of entering patients. The old adage of "Treat 'Em and Street 'Em" was a preferable alternative to manage patients who
would traditionally be triaged as low priority. Many hospitals operated on the assumption that ED "fast-tracking" would bring high patient satisfaction and positive financial returns. If turnaround time was efficient, there would be little backup in the waiting room and patients would be happier (Coston-Clark, 2013). To add, fast track systems would theoretically boost hospital profits by reducing the number of ED patients who tire of waiting and leave without being seen (Bierma, 1998). However, the number of alcohol related emergency visits has increased since 1995, signaling a greater need for appropriate intervention within the ED (Cherpitel & Ye, 2008). For many patients, an intervention in the ED may be the only medical care they receive. However, few EDs include the use of alcohol in their assessment of injured patients (World Health Organization, 2007). By convention, much preventative and chronic care is normally seen as outside the realm of emergency medicine. If questions about drinking are not asked and a high-risk patient is not showing visible signs of inebriation, that patient is more likely to be discharged without any appropriate intervention.

Early forms of treatment interventions for those with alcohol disorders have appeared as early as 1962 (Coston-Clark, 2013). In a seminal Psychological Report article, Morris Chafetz and his colleagues determined that motivational interviews within the hospital setting can significantly reduce risky behaviors associated with alcoholism (Chafetz et al., 1962). This idea was further developed and standardized in the mid-1990s, after an Addiction review confirmed the efficacy of alcohol use brief interventions (Bien et al.,1993). The
concept was named SBIRT, or Screening, Brief Intervention, and Referral to Treatment. In a few words, the technique would allow health care professionals to screen for high-risk patients, to motivate those who screened positive to considere healthier decisions, and to actively link patients to resources when needed ("What is SBIRT," 2012). The acute post-traumatic period may represent "a window of opportunity, or teachable moment, to encourage a person to change risky behaviors such as problem drinking and drinking while impaired by alcohol" (Sommers et al., 2006).

A substantial body of evidence suggested that the use of SBIRT within the ED setting would prove to be useful. To begin with, a 1999 study revealed that patients in the primary care setting were significantly less likely to report heavier drinking, alcohol dependence, and ever having treatment for an alcohol problem (Cherpitel, 1999). A multisite study reported that more than 20% meet formal criteria for alcoholism (Lowenstein et al., 1998). In an urban trauma center ED, the 5-year mortality rate among alcohol-intoxicated patients was 2.4 times that of the comparison (no alcohol) group (Davidso et al., 1997). Clearly, the use of EDs to provide interventions would be a potentially promising route to explore.

Three years after the 1993 review, Edward and Judith Bernstein tested the feasibility and effectiveness of SBIRT within Boston Medical Center's ED with their program, Project ASSERT. Health Promotion Advocates (HPAs) were trained to screen, to administer a brief negotiated interview (BNI), and to use an
active referral process for Boston's substance abuse treatment network. Their intervention resulted in a 56% reduction in alcohol use and a 64% reduction in the frequency of drinking six or more drinks in one sitting (Bernstein et al., 1997). Among a 3-month follow-up group, 50% self-reported that they had kept an appointment for treatment (Bernstein et al., 1997). Since Project ASSERT's implementation, over 50,000 patients have been screened at the Boston Medical Center ED and the model has been implemented in EDs nationwide. The Substance Abuse and Mental Health Services Administration (SAMHSA, a branch of the US Department of Health and Human Services) has endorsed SBIRT as early as 2003, and in FY 2012 SAMHSA funded almost 30 related grants totaling over thirty million dollars (SAMHSA, 2013). Even the American College of Surgeons has mandated that all Level I and II trauma centers find some way to screen for patients with alcohol problems, and that all Level I trauma centers provide interventions for at-risk and dependent drinkers (Committee on Trauma, 2006).

SBIRT is modeled based on the idea that our chronic illness model of meeting criteria for alcohol dependence is not the most accurate depiction of alcohol use. Interventions may still be necessary for preventing future injury, illness, or possible dependence. The model encompasses the broad continuum of alcohol use and attempts to effectively intervene using nonjudgmental, empathetic conversation ("What is SBIRT," 2012).
The SBIRT approach begins with a universal screening of any medically stable patients in the ED. Health promotion advocates (HPAs) ask questions regarding the patient's weekly alcohol consumption, any recent periods of heavy episodic drinking, and any nonmedical drug use. The patient's weekly alcohol consumption is then compared to the NIAAA (National Institute on Alcohol Abuse and Alcoholism) Guidelines for Low-Risk Drinking. If the patient screens positive, the interview continues ("SBIRT Videos," 2012).

One common method of screening patients involves the Alcohol Use Disorders Identification Test (AUDIT), which employs questions such as quantity and frequency of alcohol use, heavy drinking, dependence symptoms, tolerance, and alcohol-related negative consequences (Stein et al., 2009). This two-minute long questionnaire was originally developed for primary care settings, but was later expanded into the inpatient and emergency realms as well. A score of 8 or more is associated with harmful/risky drinking, while a score of 13+ in women and 15+ in men may indicate alcohol dependence (Babor et al., 2001).

The following BNI typically lasts ten minutes to one hour. This conversation is centered on open questions, affirmations that recognize patient strengths and behaviors, reflective listening, and summarizing patient points (Miller & Rollnick, 2002). The patient is asked how current alcohol use fits in within their lives. The HPA then asks the patient about the pro's and con's of drinking, paying attention to reasons why the patient would want to change his or
her alcohol use behaviors. The HPA then shares the NIAAA guidelines with the patient and relates them to the risk for social and legal problems, as well as various health issues and injury. A "Readiness Ruler" is used (Figure 1), with 1 being not ready at all and 10 being completely ready, to describe the patient's readiness to change his or her alcohol use, and a discussion continues about the patient's choice. Near the end of the conversation, an action plan is devised with the patient, focusing on steps and options that the patient has devised to maintain the behavior change and stay healthy (Coston-Clark, 2013).

Figure 1: Brief Negotiated Interview Card. This image is an example of the cards Health Promotion Advocates will present to patients. The top half denotes NIAAA guidelines for risky alcohol consumption. This includes the minimum criteria for chronic consumption as well as for heavy episodic "binge drinking" among men, women, and seniors. The "Readiness Ruler," bottom half, is described in the text. Figure from Coston-Clark, 2013.
The SBIRT Referral to Treatment option is based on the National Institute of Drug Abuse's (NIDA) Principles of Treatment, which emphasizes unique, readily available, comprehensive, and timely treatment for individuals with substance abuse disorders. Treatment and other services are not for everyone (Figure 2), but for those who can benefit, HPAs are trained to get patients any necessary medical clearance and to connect patients to treatment programs. The treatment choice depends on the patient's patterns of use, past treatment, and current health needs. Programs include detoxification facilities, primary care, youth development, LGBT services, behavioral health and counseling, and housing needs (Higgins-Biddle et al., 2009).

Specific Aims/Objectives

The vast amount of published research relating to alcohol abuse interventions precludes this analysis from being entirely comprehensive. Rather than outlining all the short and long term management methods of alcohol use, the following manuscript's goal is to provide the reader with a condensed body of data highlighting brief intervention methods used in EDs. Specifically, this thesis will outline four objectives:
1) Describe the evidence supporting SBIRT, specifically within the ED setting.

2) Clarify the data that oppose SBIRT as an effective intervention.

3) Discuss potential moderators in SBIRT studies.

4) Provide information regarding patient motivation and readiness to change.

Figure 2: SBIRT as a Targeted Intervention. The majority of screened patients fall within the NIAAA guidelines for safe drinking habits, and their behavior is encouraged. The efficacy of SBIRT as an intervention for change is centered on the top tiers in this pyramid. Both alcohol dependent and risky drinkers will participate in a BNI. For those whom and SBI alone will not be sufficient, arrangements are actively made to refer that patient to treatment services. Image from “About SBIRT Colorado,” 2013.
With SAMHSA's current and future funding of nationwide SBIRT programs, the federal government has clearly voiced its opinion regarding the usefulness of brief interventions and treatment referrals. In the midst of spiraling health care costs and limited resources, investigators must focus efforts in a productive direction in order to do the most clinical "good" for at-risk patients with every health care dollar spent. Therefore, it is expected that if SBIRT is an appropriate option, it is implemented after thorough review of past and current experiences.

It is important to note that SBIRT's scope has been expanded to include not just treatment for alcohol, but for all illegal drugs and prescription drugs used for nonmedical reasons. The papers analyzed in this article will include methods used to test and treat drug use and their subsequent results; however, to maintain brevity and focus this manuscript will primarily highlight SBIRT's effects on alcohol consumption.
METHODS

In order to retrieve and obtain relevant research articles, electronic searches were conducted utilizing the PubMed Database along with Google Scholar Search. Search terms used in the PubMed Database included SBIRT, Emergency Department, Alcohol Screening, Brief Intervention, and the MeSH term "Alcoholism/prevention and control." The search terms used when utilizing Google Scholar Search included similar entries. Articles were also found by investigating cited works of salient articles and searching for their titles through PubMed and Google Scholar Search. Only articles written in English between the years of 1989 and 2013 were considered.

After obtaining relevant articles, the publications were reviewed and hand filtered to select those with the most pertinent information. The full text papers were evaluated and categorized. Examples of categorizations used include background information, reviews that support and oppose SBIRT, articles with interesting confounding variables and biases, and article reviews. Once categorized, the journal articles were further sorted by compiling them according to clinical trials or cohort studies, ED or other departments, and subject demographic information.
RESULTS

The Case for SBIRT in EDs

To begin understanding why SBIRT has developed its reputation and widespread implementation, it is appropriate to analyze the evidence supporting its efficacy. This section will provide a brief summary and some insight on some of the more salient articles, presented in order of year the studies were published. Limitations to each study will be briefly presented, and more significant limitations will be addressed in the next section.

When Dr. Bernstein and his colleagues developed Project ASSERT at Boston Medical Center (see Introduction), they also developed a study to test its feasibility. HPAs were trained to screen patients, to perform a BNI, and to use an active referral system to pass patients onto appropriate supplementary services. Outcome measures included number of HPA initiated referrals, a patient self-report of satisfaction with Project Assert, and self-reported changes (if any) to drug and alcohol use (Bernstein et al., 1997). Over 7000 patients were screened over a one year period, with over 40% exhibiting some form of substance abuse and almost 9000 referrals made. Among the follow-up group, "50% self-reported that they had kept an appointment for treatment." In light of its apparent success, the project was granted funding as a line item by Boston Medical Center.
(Bernstein et al., 1997). It is important to note that the Project ASSERT findings did not include a control group, so the results may be limited in scope.

In a seminal 1999 study, Gentilello and colleagues performed a randomized controlled trial in a trauma center to assess the effectiveness of brief alcohol interventions in reducing alcohol consumption and subsequent alcohol-related visits. Instead of exclusively relying self-reported alcohol consumption
questionnaire, the study screened Level 1 trauma center patients with blood alcohol concentration, gamma glutamyl transpeptidase, and a Michigan Alcoholism Screening Test (Gentilello et al., 1999). After collecting results from an experimental and control group in ensuing 6- and 12-month interviews, it was found that the intervention group decreased their average alcohol consumption over than three times the rate of the control group. The effects were most pronounced in the patients with mild to moderate alcohol issues. This success was limited, however; female trauma patients and patients who self-reported more serious alcohol use did not appear to benefit from the intervention. To add, there appeared to be a statistically non-significant reduction in re-injury requiring emergency treatment (Gentilello et al., 1999).

In a subsequent 2005 study, Gentilello and colleagues assessed the effects of brief alcohol interventions in emergency settings to reduce health care costs. The population consisted of injured patients who were originally treated in the ED and subsequently admitted. Methods of calculating current and post-intervention costs involved analysis of extracted data from national databases, and previous epidemiologic and clinical studies. It was found that of the 27% of injured patients who qualified and were given a brief intervention, there was a net cost savings of $330 for each patient. This translated to a $3.81 cost savings for every dollar spent on SBIRT. It is worthwhile to note that this study did not include costs related to subsequent re-injuries, follow-up care, and rehabilitation services (Gentilello et al., 2005).
In 2006, Schermer and colleagues performed a study to evaluate SBIRT's effect on DUI (Driving Under the Influence) trauma patients in preventing subsequent DUI arrests. This involved a clinical control trial which randomly categorized DUI trauma patients into a brief intervention (experimental) and standard care (control) group (Schermer, et al., 2006). Subsequent DUI records collected from state traffic safety data showed that only 11.3% of the experimental group were involved in a DUI within a three-year period, as compared to 21.9% of the control group. The risk difference implies that one DUI can be prevented for every nine patients provided with a brief intervention (Schermer et al., 2006). It is worth noting that only three of four eligible patients participated, which would lead to a possible selection bias and external validity compromise. Selection bias assumes the risk that the data will lead to results that may not necessarily lead to externally valid results. Data from this study also did not include out-of-state DUI arrests.

Dauer and colleagues set out to assess the value of SBIRT in reducing alcohol consumption in alcohol-positive traffic casualties in adults. In this study, patients were screened using an "Alcohol-On-Site" saliva sample and allocated into either a BNI or a minimal intervention group and data was examined via intention-to-treat analysis (intent-to-treat means that once a subject is enrolled, they will continue to be part of the study even if they drop out) (Dauer et al., 2006). After following up with telephone interviews at 3, 6, and 12 months, significant drops in weekly consumption and heavy episodic drinking were noted.
Similar to other attempts at randomized clinical trials in this realm, the control group had to receive some sort of intervention for ethical reasons. To add, sample sizes were very small (a total of 75 subjects), and significant loss to follow-up may have resulted in informational bias (Dauer et al., 2006).

In 2007, the Academic ED SBIRT Research Collaborative published a study in the *Annals of Emergency Medicine* assessing the impact of SBIRT in reducing alcohol consumption among emergency medicine patients from 14 sites nationwide. This was done using quasi-experimental comparison groups. The intervention group received a handout and a brief intervention while the control group received just a handout, and subsequent drinking habits were assessed via telephone interview after a three month follow-up period (*Annals*, 2007). Results showed that BNI patients reported consuming an average of 3.25 fewer drinks per week than the control group and appeared to consume less alcohol during periods of heavy episodic drinking. This study relied heavily on self-reported answers (which may have skewed results), and patient recruitment was limited by the availability of trained research staff at each of the 14 tested sites. Similar to Gentilello's 1999 study, highly dependent drinkers did not seem to benefit from a brief negotiated interview as effectively as at-risk drinkers (*Annals*, 2007).

A 2007 study by Mello and colleagues attempted to understand the efficacy of SBIRT on patients who screened positive for alcohol use after they
were already discharged back home (Mello et al., 2007). After discharge, the patients received a telephone call and were assigned to a treatment or control group based on a series of questions pertaining to their current alcohol use. The treatment consisted of two BNI telephone sessions, and both groups were assessed after a three month period (Mello et al., 2008). For both groups, mean AUDIT scores decreased; however, BNIs seemed to be disproportionately effective in decreasing impaired driving within the treatment group. One of the study's limitations discusses the fact that a large number of patients were excluded because they were presenting for treatment of an illness rather than an injury. Also, some interested participants were unable to be contacted. This again may have resulted in a selection bias. Nevertheless, the study showed promise as a potential model to move SBIRT out of the emergency setting with telephone intervention substitutions and to minimize valuable use of ED physicians' time (Mello et al., 2008).

In 2013, Murphy and colleagues published an article in *Addiction Science & Clinical Practice* to assess the feasibility of using a computerized alcohol-screening interview (CASI) to find at-risk patients within the ED, to provide a brief intervention, and to refer patients to treatment (Murphy et al., 2013). Research assistants screened patients and brought CASI to the patient, where the patient was responsible for filling out the alcohol consumption data by themselves (Murphy et al., 2013). If patients screened positive for at-risk or dependent drinking, CASI would provide a BNI and referral to treatment (if the patient
requested it). Results were generally positive, and CASI was accepted by both staff and patients as an effective substitute for a personal interview. The program accurately provided patient education, and almost 40% reported "some likeliness to change their alcohol use." The study concluded that "there is a high preference for technology-based behavioral interventions among ED patients," and that a computerized system has the advantage of reaching more people with fewer resources (Murphy et al., 2013). Because of these benefits, CASI poses a potentially viable alternative to the traditional style of brief interventions. However, due to its cross sectional design, this study was not able to fully evaluate the durability of patient willingness to change when minimal person-to-person interaction was involved.

The Case Against SBIRT in EDs

A limited number of studies have also shown mixed correlation between the use of SBIRT and subsequent reductions in alcohol consumption. For example, Longabaugh and colleagues conducted a 2001 study which aimed to test whether a BNI with or without a booster session (booster sessions are refresher sessions following the primary intervention) would improve drinking-related outcomes more than standard ED treatment (Longabaugh et al., 2001). The study presented limited results, as the only group that seemed to exhibit a
substantial reduction in alcohol-related negative consequences was the group who received an initial BNI and an additional booster session. There seemed to be no difference, however, between those who received just a BNI and the group who received no intervention (standard care) (Longabaugh et al., 2001). The study cast doubt on the effectiveness of using SBIRT alone as a minimal intervention without a booster session. The conclusion may have some merit, since the constant activity and commotion may offer a variety of interruptions to provide medical care, interruptions that could be avoided if an intervention were staged outside the ED.

In 2007 Daeppen and colleagues evaluated the effectiveness of BNI in reducing alcohol use among injured patients in the emergency department, and whether assessment of alcohol use without a BNI was sufficient to reduce drinking (Daeppen et al., 2007). The study was conducted in Switzerland, and over 5000 patients were screened for a sample size of 987 randomized patients into a BNI or control group (with or without screening assessment) (Daeppen et al., 2007). Regardless of the intervention group, the 770 patients who reported back after a twelve-month follow-up period all exhibited similar reductions in harmful drinking habits including frequency, quantity, binge drinking, and AUDIT scores. Thus, the data in this study offered evidence that a BNI had little to no influence on patient alcohol use (Daeppen et al., 2007).
D’Onforio and colleagues set out to test a hypothesis similar to Daeppen within the Connecticut Yale-New Haven Hospital. Patients in a randomized clinical trial who screened above the NIAAA drinking guidelines were separated into BNI and "Discharge Instructions" groups. The Discharge Instructions group received "scripted discharge instructions read by the emergency practitioner, designed to be less than 1 minute in length" (D’Onofrio et al., 2008) which covered recommendations ranging from alcohol intake to seatbelt use. Number of drinks per week as well as binge drinking episodes were collected retrospectively and at 6 and 12 month follow-up periods. After assessing the 500 patients who participated, D’Onforio’s team found similar decreases for both BNI and Discharge Instructions groups, suggesting that there was little evidence proving the superiority of a brief interview (D’Onofrio et al., 2008).
DISCUSSION

SBIRT Study Moderators

To summarize the previous two sections, the results of SBIRT studies within the emergency setting have proven to be ambiguous at best. While several studies have found a significant association between brief interventions and harmful drinking habits (as well as actions and injuries associated with them), most seemed to exhibit significant limitations. To add, a few studies have offered confirmation that SBIRT does not appear to have any effect at all. Upon further analysis, several moderators may reflect on the validity of all these results. In this section, these varying factors within SBIRT efficacy studies will be considered and evaluated.

Ethnicity

Field and colleagues headed a 2010 study at the University of Texas at Austin comparing ethnic responses to brief interventions (Field et al., 2010a). They found that "Blacks and Hispanics with alcohol abuse dependence are significantly less likely than comparable Whites to receive formal treatment" (Field et al., 2010a). Patients representing all three racial/ethnic groups were screened and randomly assigned to either a BNI or standard care group.
Following the intervention, several variables such as weekly consumption, maximum amount with heavy episodic drinking, percent days abstinent and percent days heavy drinking were assessed at 6 and 12 month follow-up periods. Analysis of the data revealed that all three groups showed substantial evidence of reduction in consumption across the variables, regardless of treatment assignment. However, BNI appeared to be most effective among Hispanics. While findings were limited and not necessarily generalizable to other ethnic groups, this study does indeed show that ethnicity does play a role in SBIRT's effectiveness.

Alcohol Severity

Alcohol severity (the extent of patient alcohol dependence) may play a factor as a moderator of SBIRT reports. Studies within the past 5-10 years have excluded dependent drinkers from participation because SBIRT has historically been significantly more effective for only at-risk drinkers (Field et al., 2010b). However, it is important to note that alcohol dependent drinkers were included in Field's study and seemed to substantially benefit from brief motivational interventions (Field et al., 2010a).

To further clarify alcohol severity results, Mello and colleagues performed a study in Rhode Island Hospital to analyze the effectiveness of telephonic SBIRT with patients who suffered from motor vehicle collisions. Up until then, the
studies tended to focus on either injuries in general or DUI arrests, and many used face-to-face interaction between patients and staff. Mello randomized patients to telephonic BNI and control groups and provided two telephone interventions after the patient's discharge. At three months, both groups were assessed about alcohol use and impaired driving (Mello et al., 2008). The results seemed to indicate decreased impaired driving among the treatment group; they offered a suggestion that SBIRT’s effectiveness "can extend beyond the ED visit, and interventions may not need to be conducted during the visit to be effective."

To add to these findings, Mello found that patients who had the most severe AUDIT scores appeared to benefit the most from the telephone conversations (Mello et al., 2008).

In a 2007 study, Soderstrom and colleagues analyzed the effectiveness of two types of brief interventions: a personalized motivational intervention (PMI) or a brief information and generic advice session (BIA) which consisted of a brochure and one post-discharge telephone contact. After data was collected 6 and 12 months post-injury, both the PMI and BIA groups appeared to have significant reductions in harmful alcohol consumption. Similar to the Mello 2008 study, the strongest effects seemed to be concentrated in the groups with highest risk criteria for dependence. Conversely, those with the lowest-risk behaviors showed the least significant differences after the follow-up periods (Figure 3) (Soderstrom et al., 2007). In brief, this study as well as Field's and Mello's reports show that "alcohol severity" may be a factor which needs to be further explored.
since it may be a reason as to why some studies in this manuscript showed no evidence of successful results.

Type of Injury

Type of injury may be a key confounder with brief interventions. Mello and colleagues performed a study in the United Kingdom (UK) specifically assessing patients with alcohol-related maxillofacial injuries in specialty outpatient clinics. The report noted that alcohol excess and interpersonal violence are two significant etiologic factors for facial trauma in the UK. Researchers screened patients with an AUDIT score, randomized them into groups, and followed with the patients 3 and 12 months after the intervention (Mello et al., 2005). The responses among these patients were generally favorable, with the intervention group showing substantially decreased AUDIT scores after follow-up. Of note, the report also mentioned that type of injury may have been a large moderator, since patients involved in motor vehicle collisions were more receptive to a BNI than those with other injuries. This may have to do with the psychological impact of an injury related to a collision, since the outcome is usually more jarring for the patient than other injuries.

Setting Disparities

Setting may also play a key role in SBIRT efficacy. Emergency settings can range from inpatient to outpatient, from emergency departments to intensive
care and trauma units. Older SBIRT reviews seem to consider all these reviews at the same time. For example, In Nilsen and colleagues’ manuscript "A systematic review of emergency care brief alcohol interventions for injury patients," results were reported after considering all injured patients within all the aforementioned settings. "The patients were treated, and BNIs were performed in emergency care settings (inpatient or outpatient) and/or in follow-up outpatient care following emergency care" (Nilsen et al., 2008). This approach may cause subsequent limitations to external validity. Different emergency settings and

![Graphs showing number of drinks consumed after follow-up](image)

**Figure 3: Number of drinks consumed after follow-up.** Lines for both BIA’s and PMI’s are included in graphs distinguishing lower, medium, and higher level drinkers. The y-axis represents the number of drinks consumed within the last 90 days. Both types of interventions seemed to have measurable effect on all categories, with higher level drinkers exhibiting the largest durable decreases in consumption within the one year follow-up period (Figure from Soderstrom et al., 2007)
patient characteristics may affect how patients cope with the current situation and its relation to their alcohol consumption habits. For example, the inpatient setting "may present fewer interruptions, but the severity of the patient’s medical condition, particularly among patients with trauma, may be a limiting factor to the provision of brief intervention" (Field et al., 2010). Dissimilar geographic locations may also host diverse patient populations who may respond differently to the same treatment. This idea may explain Daeppen and colleagues' conclusion that Swiss patients showed no demonstrable response to SBIRT when compared to standard treatment (Daeppen et al., 2007). In brief, attempting to condense this variety of results into a generalizable conclusion may pose a significant issue.

Adherence to Traditional Clinical Trial Guidelines

Another moderating factor to consider involves the sometimes loose adherence to the specific principles of randomized clinical trials performed in the aforementioned studies. Typically, clinical trials tend to have well-established protocols such as standardized screening, specific, distinct inclusion and exclusion criteria, and consistently delivered treatment procedures. With many of the previously mentioned studies, not all trials met these ideal conditions. To begin with, some studies would involve mixed interviewers such as HPAs, physicians, and nurses. Others either filtered through a wide range of patients
from diverse settings, evaluated several variables of interest, or made little
distinction between different types of brief interventions (Field et al., 2010).

Clarification and differentiation between different definitions of "brief
interventions" may also be helpful in understanding the external validity of
studies. For example, Moyer and colleagues performed a review comparing brief
interventions with either control or extended treatment conditions. The results
showed that there was little difference between a brief intervention with control
conditions and one with extended treatment (Moyer et al., 2002). The
researchers attempted to utilize studies based on brief interventions definitions
that were "as consistent and concrete as possible, while being cognizant of the
variety of characteristics that may have been implicitly or explicitly considered to
be components of such treatment." However, out of the 14 included studies, 10
involved a single session, 8 involved motivational interviewing, and 8 included a
handout of either generic or personalized advice regarding alcohol use (Moyer et
al., 2002). Because of this lack of specific interventional focus, it may be difficult
to assess which approach truly is effective and which study results can be
generalized for emergency settings.

Adding to the theme of adherence to clinical trial guidelines, proper
inclusion and exclusion criteria may not have been thoroughly met. To illustrate,
Beich and colleagues performed a 2003 study assessing the effectiveness of
SBIRT in general practice. The study involved a systematic review and analysis
of eight randomized controlled trials, and the experimental variables focused on numbers recruited, proportion of positively screened patients, proportions given BNIs, and the overall effect of the screening process. The questionnaires included for screening were either administered during consultation, by telephone, or by mail. One of the results related to potential compromises to external validity (Beich et al., 2003). Beich argued that, based on Feinstein's model to assess patient losses (Figure 4), typically "three out of four people identified by screening as excessive users of alcohol did not qualify for the intervention after a secondary assessment" (Beich et al., 2003). In summary, lack of a screening process that truly identifies at-risk patients may preclude that model from being a feasible tool for general practice. For this reason, it may be prudent to perform follow-up studies with more appropriate screening guidelines. This ideal may be difficult to achieve, since highly controlled trials can be difficult to implement in emergency settings. In addition, several SBIRT efficacy studies were performed in multiple sites. This strategy poses certain pitfalls. As outlined by Dr. Helena Kraemer, certain shortcomings of multisite randomized clinical trials include little communication among researchers, neglect of site differences and subsequent variations with treatment outcomes, and lack of variability assessment. Kraemer argues that by averaging individual data points within and between sites, treatments may be "liable to be recommended and used for many subjects in the population for whom it does not good" (Kraemer, 2000). Of
course, these are generalizations and the specific multisite SBIRT studies may have taken measures to control for one or more of these issues.

Figure 4: Feinstein's Model to Assess Losses. This model distinguishes the group of study participants from the rest of the screening process. The "not available group" refused screening, were treated elsewhere, didn't use health care, etc. The "non-specified loss" group did not show a demonstrable reason for the loss. The "non-accessible" group were lost to follow-up after initial screening (moved away, died, old contact information, etc.). The "not eligible/excluded" group were removed by protocol (usually after a careful assessment following a false positive screening, comorbidity, non-compliance, etc). The "non-receptive group" refused further participation at some point. The "study participants" group are the only group left who were admitted to the study and were followed up with according to protocol (Figure from Feinstein, 1985).
**Referral to Treatment**

Lastly, few of the numerous aforementioned studies in this manuscript have given much thought to the Referral to Treatment portion of SBIRT, choosing instead to focus on screening appropriate patients and providing brief negotiated interviews. For many of these patients, a referral to the appropriate services may be a crucial part of their willingness to make changes based on a BNI. In a 2007 SAMHSA report, the principal reasons for patients (aged 12+ years) not receiving alcohol and substance use treatment were cost/insurance and other access barriers and social stigma associated with accessing services ("SAMHSA," 2007). In NIAAA's 2001-2002 National Epidemiologic Survey on Alcohol and Related Conditions publication, 36% of alcohol-dependent US adults who began treatment in 2000 were in full recovery, 27% were in partial remission, 12% were asymptomatic high risk drinkers, and only 25% maintained dependence (NIAAA, 2006). Treatment can range from detoxification and short-term acute care to holdings/transitions, long-term treatment and recovery programs, and outpatient counseling. SBIRT can have enormous utility in this realm; BNIs can persuade patients to create an action plan, to connect patients with available treatment facilities and programs, and to assist with obtaining any necessary medical clearance. Since studies have neglected use of treatment referrals as an outcome variable, SBIRT's full potential sphere of influence has not been suitably
demonstrated to the degree necessary for appropriate conclusions. Future efficacy studies can benefit from treatment services inclusion, as it may boost the chance of achieving durable change for at-risk and dependent patients.

Factors for Motivation and Behavior Change

To date, few studies have carefully analyzed the social factors which may influence SBIRT's efficacy. In order to enhance our understanding of SBIRT as a viable treatment method, researchers must pay special consideration to the patients they are hoping to reach. Achieving durable behavior change is typically more complicated than a generic screen and intervention; it involves some knowledge of individual and community level theories for motivation which will be further discussed in this section. These theories work under the assumption that while individuals are autonomous beings with personalities, goals, and the ability to take action, they are also influenced by environmental (including social, cultural, and faith-based) factors which connect them to the world (Rimer & Glanz, 2005).

To begin with, several appropriate critiques of SBIRT can be made using the Health Belief Model (HBM) as a guideline for evaluation. The Health Belief Model (Figure 5) is based on the idea that individual health behaviors are related to motivation, and that a number of factors affect motivation. The first part of the Health Belief Model centers on perceived threat, which includes perceived
susceptibility and perceived risk. Perceived susceptibility is the patient's perceived risk of being adversely affected by their alcohol use, while perceived severity is the patient's opinion of how serious the consequences if he or she continues their current alcohol use (Rimer & Glanz, 2005). Along with the other factors of the Health Belief Model, these are likely to change from person to person. Within the ED, patients' perceived susceptibility centers on their perceived seriousness of the event that brought them into the ED, the role of alcohol in that event, and their emotional reaction to the event itself. As mentioned in the 2005 Mello et. al study, patients involved in motor vehicle

**Figure 5: Health Belief Model.** Figure derived from Rimer & Glanz, 2005.
collisions were more receptive to a BNI than those with other injuries and illnesses. Perhaps this is attributable to the direct trauma and physical impact of their injuries; the upfront effects may be perceived as more salient when compared to a chronic illness or less severe mechanism of injury. Patients may also deny that the event was directly related to alcohol use, and they may downplay the significance of that event. These factors may subsequently augment or diminish the possibility of change. In an analysis report performed by Cherpitel and colleagues, "half of those patients [in the studies who were] drinking prior to injury attributed a causal association of their injury with alcohol consumption" (Cherpitel, 1999). In a 2007 study by Nilsen and colleagues, only 10% of the 1930 study patients who reported drinking acknowledged alcohol as a factor in their injury. However, those who confirmed the association between alcohol and the injury were more likely to change their drinking behavior (Nilsen et al., 2007). Lastly, Walton and colleagues concluded from their study that "individuals who attributed their injury to alcohol and received advice had significantly lower levels of average weekly alcohol consumption and less frequent heavy drinking" (Walton et al., 2008). These studies suggest that highlighting the alcohol/injury connection in SBIRT can boost its efficacy. Possible change strategies based on these factors can include tailing risk information based on patients' individual characteristics/behaviors, helping patients develop an accurate perception of their own risk, and outlining consequences of unhealthy behaviors (Rimer & Glanz, 2005).
Outcome expectations consist of both perceived benefits and perceived barriers. Perceived benefits are the possible positive outcomes the patient perceives from taking the recommended action, while perceived barriers are the possible negative outcomes the patient perceives (the fewer barriers, the higher chance the patient will follow through with the recommended action). This involves strengthening the patient's awareness of the inconsistency of alcohol's place within their broader life values and goals (Rimer & Glanz, 2005). Some SBIRT programs attempt to delve into this in a personalized BNI by asking emphasizing the "Readiness Ruler" (see Introduction). If patients choose a 5 on the ruler (or any number over 2), the HPA can reflect by stating that the patient is 50% ready to make a change (If 6, then 60%, etc.), and asking the patient why he or she did not choose a lower number. This gives the patient an opportunity to contemplate why making a change would potentially benefit his or her current situation. It is also important to consider potential barriers to change, such as perceived benefits of drinking, employment status, marital status, lack of social support, failed treatment attempts, and so on ("Treatment," 1999). Without addressing these impediments, patients will likely maintain status quo once they are discharged. Saunders and colleagues confirmed that incorporating perceived benefits and barriers into brief interventions provided more successful results among opiate users attending a methadone program (Saunders et al., 1995). Rohsenow and colleagues arrived to a similar conclusion when investigating the effects of motivational interviews on cocaine users (Rohsenow et al., 2004). A
detailed study involving at-risk and dependent drinkers may be helpful to enhance current SBIRT methods. Potential change strategies to influence outcome expectations involves stressing the potential positive results of behavior change, offering reassurance and incentives, and correcting misinformation (Rimer & Glanz, 2005).

Both perceived threat and outcome expectations are central factors to self-efficacy, one of the most crucial components of durable behavior change. Once patients are motivated enough to make changes, they must be confident enough in their ability to maintain that change over a sustained period of time. Steps to address self-efficacy are sometimes included in BNI's, but their effects have not been well evaluated in alcohol intervention studies (Barnett et al., 2010). From a study by Galbraith and colleagues, use of BNI with problem drinkers often helped improve patients' sense of self-efficacy (Galbraith, 1989). However, other studies have shown mixed results (Rohsenow et al., 2004; Saunders et al., 1995). Researchers and clinicians should use this evidence to improve current SBIRT methods in emergency departments. Some suggestions can include provide training and guidance, goal setting, and offering verbal reinforcement to improve confidence (Rimer & Glanz, 2005).

In brief, HBM is a useful set of guidelines which may effectively increase the efficacy of SBIRT as an alcohol intervention. Researchers must keep in mind that this model must be tailored to patients to deliver the most benefit. However,
HBM does have its limitations. It does not account for knowledge and social disparities, neither does it account for subjective and personal norms. Other models such as the Theory of Planned Behavior may further clarify reasons for motivation (Figure 6). This theory explains that behavioral intention follows from a person’s attitude towards a specific behavior, perception of the subjective norms associated with that behavior, and perceived behavioral control. An individual's motivating factors may include their "micro-environment" and their perceived (or lack of perceived) control within his or her surroundings (Edberg, 2010). Different emergency settings and patient characteristics may enhance or weaken a patient's perceived control to make durable changes to their alcohol consumption habits. Keeping this information in mind can be useful when implementing updated brief intervention methods.

Figure 6: Theory of Planned Behavior. Figure derived from Rimer & Glanz, 2005.
One limitation to both the Health Belief Model and the Theory of Planned behavior is that they both focus on reflections of behavior at the specific time the patient is being assessed. Patients may not necessarily go through one process when making a decision, but rather proceed through a cluster of "small" decisions. While the simplicity of these models could be useful for implementation, theories such as the Transtheoretical Model (TTM) may be more inclusive of this process. This model (Figure 6) reflects behavior as change occurring in stages over time.

TTM begins at the Precontemplation stage, although people can enter the model at any point. This stage assumes that the patient is against making a change; either they are not aware of an issue with their behavior or they are not motivated to change because the cons heavily outweigh the pros (Edberg, 2007). Stein and colleagues explain that "for those who are not already motivated to reduce their drinking, a brief...intervention may not be sufficient to lead to sustained behavioral changes that reduce alcohol-related negative consequences" (Stein et al., 2009). It has therefore been suggested that more systematic patient screening incorporate readiness to change, as only a portion of eligible participants may be receptive to a BNI. This will "permit a more efficient use of available resources and ....could result in a more cost-effective intervention." For those who are unconscious of the necessity to change their behavior, increasing awareness of alcohol associated risks may be sufficient to assist them on to the Contemplation stage (Edberg, 2007).
The Contemplation stage represents a "decisional balance" for those who are considering change. While patients may still not be ready at the moment, the perceived pros equal the cons and they may intend to make changes to alcohol
consumption within 6 months (Edberg, 2007). Leet and colleagues suggested that patients with higher readiness to change prior to a BNI are "more likely to complete high-quality plans involving reduction of consequences from alcohol reduction" (Lee et al., 2010). Patients who have already experienced substantial negative alcohol-related consequences before visiting the ED may be more ready to reduce alcohol consumption (Minugh et al., 2009). As discussed earlier, the saliency of the event to the patient may be a large factor in making the patient more likely to progress into the next TTIM stage, Preparation (Apodaca & Longabaugh, 2009). Saliency may preclude the need to emphasize brief interventions for patients and may be sufficient enough to promote self-change. However specific strategies such as motivational talks and encouragement to make specific plans can be useful in advancing the patient to Preparation (Rimer & Glanz, 2005).

The Preparation stage represents patients who are prepared and have the intent to make an actionable change within the next month. At this point, the biggest con to change would be fear of failure (Edberg, 2007). Based on a 2007 study, Baird and colleagues made the conclusion that patients who receive two BNI sessions are more ready to make changes than those who receive only one BNI (Baird et al., 2007). Lee and colleagues also concluded that patients who are more ready to make changes prior to the BMI are more prone to accomplishing more ambitious drink cutback goals and subsequent reductions in associated negative consequences (Lee et al., 2010). Some patients present in the ED
already in the Preparation phase, actively seeking treatment. For those patients (who are already motivated pre-treatment), those patients are already ready to change and move on to the Action stage. For those who need to be helped along, possible strategies such as developing concrete plans and setting gradual goals may be useful (Rimer & Glanz, 2005).

The Action stage pertains to patients who have presented to the ED after already attempting a new behavior within the past six months. Patients may be likely to suffer relapses in following through with their changes, but are still already aware of the benefits of alcohol reduction (Rimer & Glanz, 2005). For these patients, it is of vital importance that the patient avoid people and situations that would encourage further unhealthy behavior. Other change strategies to assist the patient move to the Maintenance stage include assisting with feedback, individual problem solving, and reinforcement of positive behaviors (Edberg, 2007).

The Maintenance stage may not necessarily pertain to patients who are presenting in the ED with an alcohol-related injury or illness. This stage is usually reserved for patients who made a change over six months prior to the evaluation and who are working to prevent relapse (Edberg, 2007). In general, these patients, as well as those in the Termination stage, will likely screen negative in an AUDIT or similar scoring system. Nevertheless, Maintenance stage patients can still sometimes benefit from a brief interview. Those who are helped along
with a quality change plan are "more likely to sustain high motivation to reduce alcohol related consequences through at least three months following the intervention" (Stein et al., 2009). To add, patients who "reported higher levels of self-efficacy had lower weekly consumption and consequences" (Walton et al., 2008). These patients can be supported with brief interventional strategies such as assisting with coping, employing reminders, encouraging relapse avoidance, and maintaining self-efficacy (Rimer & Glanz, 2005).

Individual theories such as the Health Belief Model, the Theory of Planned Behavior, and the Transtheoretical Model are helpful in understanding intrapersonal reasons for motivation. However, they have limitations. For

![Figure 8: Reciprocal Determinism of Social Cognitive Theory.](image)

Reciprocal determinism stresses the dynamic interaction between behavior, personal factors, and environmental factors when assessing behavior changes. Figure derived from Rimer & Glanz, 2005.
example, they simplify the complex human response, ignore social context such as patient environment, and ignore cognitive aspects such as emotions, thought processes, and memory. Several theories have attempted to include social and environmental contexts in their principles; among them is the Social Cognitive Theory.

The Social Cognitive Theory (SCT) describes a dynamic process in which the environment, personal factors, and human behavior influence each other. For example, while some personal characteristics are learned, others such as sex are conventionally immutable. Few studies have evaluated the effect of sex on SBIRT efficacy, and based on the interactions outlined in SCT there may be a basis to further pursue this potential moderator of behavior change. In general, alcohol abuse is more stigmatized for women than for men, and as a result women may be less inclined to pursue treatment services for their alcohol consumption (Beckman, 1994). However, while results from some alcohol intervention studies have shown that women are more responsive to interventions than men (Blow et al., 2006; Daeppen et al., 2007), other studies have reached conflicting conclusions (Anderson & Scott, 1992, 1992). In a more recent Boston Medical Center study, Saitz and colleagues screened medical inpatients, provided BNIs and collected follow-up data 3 and 12 months after enrollment. Among dependent drinkers, women were less likely to have received recent treatment, detoxification, or halfway house services. They, along with young adults (<44 years), seemed to benefit most from a brief intervention (Saitz
et al., 2009). This example of reciprocal determinism is a crucial factor in receptiveness to change. Other personal factors such as race, ethnicity, religion, employment status, health insurance coverage, education level, must be evaluated within the context of SBIRT in order to better understand the reasons for patient behavior.

Based on this overview of social and personal factors affecting behavior and motivation, it is evident that a readiness to change theoretical framework may be a crucial next step in SBIRT's evolution as a viable treatment option. It is only when we take into account this social level of individual health that we begin to understand the nuances of durable behavior change and the dynamics of potential treatment effects. While some studies have begun to explore motivational theories in SBIRT application, they have been mostly limited by use of brief measures in the screening process. It may be prudent to formally test more comprehensive measures, which may yield different and (hopefully) more advantageous results.
CONCLUSION

Alcohol misuse and dependence have risen among the ranks of preventable death causes through recent history. This has created a social and economic burden on a society that is currently shouldering over $223 billion in lost productivity, healthcare, and criminal justice costs (Bouchery et al., 2011). Treatment has traditionally been reserved for those who have met the alcohol abuse or dependence criteria ("SBIRT History," 2010), but the emergence of SBIRT has potentially revolutionized the strategies used to reach the at-risk population of drinkers, specifically within emergency departments. Since its 1962 origins, SBIRT has received government recognition in the form of substantial grants as well as mandates for trauma centers to screen for problem drinkers (Committee on Trauma, 2006; SAMHSA, 2013).

Several studies, outlined above, have confirmed the efficacy of SBIRT as a viable ED intervention method. From its roots in the Boston Medical Center ED, tens of thousands of patients have been screened with positive results. These measures have included keeping appointments for treatment, decreased average alcohol consumption and heavy episodic drinking, reduction in health care costs, and reduction in subsequent DUIs and alcohol-related re-injury requiring emergency treatment. In many studies, the effects were most pronounced in the patients with mild to moderate alcohol issues. New methods of treatment such as
CASI and telephonic interviewing post-discharge appeared to show some promise in reducing required resources and providing more access. The success came with some limitations, however. Some subpopulations (highly-dependent drinkers and female patients) would occasionally not benefit as much as others in the study. There was often an opportunity for selection bias depending on the proportion of eligible patients who participated and the frequently small sample sizes. To add, most of these studies heavily relied on self-reported answers, resulting in possible informational bias.

In contrast, some studies have been more wary about SBIRT's efficacy. Longabough claimed that BNI's are ineffective unless followed up with a booster session (Longabaugh et al., 2001). Daeppen concluded that there were no significant outcome differences between intervention and standard care groups, as both showed equal reductions in harmful drinking habits and AUDIT scores (Daeppen et al., 2007). Similarly, D'Onforio found little superiority of BNI over standard care (D'Onofrio et al., 2008).

This mixed evidence can be attributed to several potential moderators. Based on the Field 2010a study, ethnicity seems to play a significant role in access to care and admission to formal treatment options. Alcohol severity may also confound study results; most studies have historically excluded highly-dependent drinkers from SBIRT intervention because they are not likely to benefit from a brief interview. However, studies have shown that dependent drinkers may actually be the most likely to benefit from such interventions (Field
et. al, 2010b; Soderstrom et. al, 2007). Lack of information regarding alcohol severity may also be reason as to why some studies showed have shown little evidence of successful BNI results. Type of injury plays a role; injuries such as motor vehicle collisions may have a higher psychological impact on patients and their willingness to change behavior than less dramatic injuries or illnesses (Mello et. al, 2005). Setting disparities, including interdepartmental and geographic differences, may affect how patients deal with their current situation. Loose adherence to historically strict clinical trial guidelines may also impact results. These include factors such as variability of staff interviewers and within patient groups as well as lack of consensus on the definition of brief intervention (Moyer et al., 2002) or on proper inclusion and exclusion criteria (Beich et. al, 2003). Finally, the lack of conclusive evidence based on referral to treatment options thoroughly undermines the results of any studies that choose to overlook this concept. Future study designs can benefit from paying careful attention to these moderators and accounting for related confounding variables.

Lastly, analysis of patient motivations and behavior change patterns is essential in assuring durable BNI success. A number of models and theories have been discussed in this manuscript with the hope that readers can appreciate their utility. Variables within these constructs include patients' perceived threat and outcome expectations (through HBM), behavioral attitudes (through TPB), positive outlook development (through TTM), and reciprocal determinism (through SCT). Each of these theories offers new viewpoints
regarding patient behavior, and proper use of these viewpoints when designing subsequent efficacy studies can have a significant impact on their outcomes.

Alcohol misuse is the single most important risk factor for injury, and to date it is the most promising yet underutilized target for injury prevention. SBIRT in EDs has provided a significant yet and cost and resource-effective method of curbing alcohol misuse. Results from efficacy studies will hopefully mirror the SBIRT's evolution and resulting improvements to our nation's health.


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EDUCATION

Boston University, MA in Medical Sciences; Master in Public Health    May 2013
Boston University, BS, Human Physiology         May 2009

PROFESSIONAL EXPERIENCE

Boston University Emergency Medical Services, Boston, MA, Part Time
September 2012 - Present
EMS Instructor
  ❖ Nationally Certified CPR/First Aid Instructor
  ❖ EMT Lab Instructor

Boston University School of Medicine, Boston, MA, Part Time
September 2012 - December 2012
Physiology Tutor
  ❖ Physiology tutor for MAMS students

Fallon Ambulance, Quincy, MA, Part Time
January 2011 - June 2012
Emergency Medical Technician
  ❖ Assess acute trauma and medical patients by assessing life-threatening symptoms, performing a detailed physical examination & vitals, and determining pre-existing medical conditions with patient history documentation
  ❖ Provide emergency interventions to treat and stabilize critical patients under Massachusetts OEMS Protocol and Online Medical Direction
  ❖ Transport and monitor patients for inter-facility transfers
  ❖ ACLS, PHTLS, and HAZMAT certified
Beth Israel Deaconess Medical Center, Boston, MA, Full Time
October 2009 - September 2011
Acute Care Surgeons' Assistant
- Room patients, obtain vitals, compile brief patient overview and present to attending surgeon
- Schedule patients for surgeries, expedite clearance with tests/lab work, and instruct patients on surgery preparation
- Triage patients on phone, make appropriate decisions to allocate patient to most appropriate treatment area
- Assist surgeon with writing research proposals and securing funds for NIH and other government grants
- Elected "Champion of Change" for Surgery in recognition of excellence in patient service and satisfaction.

Brookline Village Dermatology, Brookline, MA
March 2008 - October 2009
Administrative Assistant
- Analyzed, developed, and implemented voice-activated program functionality for sending dictated letters to patients' primary care physicians, minimizing processing time by 80%
- Shadowed dermatologist and scribed progress notes during patient follow-ups
- Tracked biopsy results and ensured timely communication to physicians and patients

Urban Medical Group, Jamaica Plain, MA
July 2007 - January 2008
Medical Assistant
- Facilitated communication between health care facilities to verify patient record completion
- Assured continuity of care by monitoring appointments and ensuring compliance
- Managed warfarin records & INR appointments and confirmed that results were read in a timely fashion
- Assessed Medicare eligibility by analyzing medical histories and chart documentations in nursing facilities around city, work resulted in an increase of the target population's eligibility rate by 30%
Keyes Pharmacy, Auburndale, MA
March 2005 - August 2007
Pharmacy Technician and Cashier
- Initialized prescription refills under pharmacist direction and filled all available prescriptions
- Triaged phone calls and communicated with the pharmacist appropriately
- Counseled patients regarding over-the-counter products with experience gained from pharmacists
- Developed and implemented a computerized billing service for nursing homes and inventories for insurance claims, substantially reducing processing times

VOLUNTEER EXPERIENCE

Boston University, Boston, MA
February 2012 - present
- Active part of the GMSSO (Graduate Medical Sciences Student Organization), and a member of the MAMS (Masters in Medical Sciences) Subcommittee. This subcommittee is responsible for serving as a voice for the program as well as for planning events for MAMS students.

American Red Cross, Cambridge, MA
February 2012 - present
- Nationally Certified CPR/First Aid Instructor,

American Red Cross, Boston, MA
February 2011 - present
- Disaster services volunteer equipped with fundamental skills to provide for short and long term needs of disaster clients, including basic survival and shelter requirements

Samaritans of Boston, Boston, MA
December 2010 - present
- Suicide prevention helpline volunteer responsible for providing confidential emotional support to suicidal and at-risk population of Massachusetts

Boston Medical Reserve Corps, Boston, MA
October 2010 - present
- Chosen as a featured volunteer in MRC Volunteer Spotlight of MA Dept of Public Health's monthly newsletter
- Volunteer Leader, available as an EMT during a local disaster and during citywide events (flu clinic, Boston Marathon, etc.)
Boston Marathon, Boston, MA  
April 2012  
- Assigned as sole emergency medical technician in one of four medical buses picking up runners for transport to downtown Boston  
- Monitored patient statuses and performed first aid for over 200 runners

Boston University, Boston, MA  
May 2008 - July 2008  
- Selected as a Systems Physiology undergraduate lab assistant responsible for aiding teaching fellow, assisting students with all course related questions, and teaching accurate lab techniques

MUSICAL EXPERIENCE
- Accomplished instrumentalist (violin, viola) classically trained from 1998 - 2005 and graduated from the New England Conservatory (NEC) Preparatory School
- Performed in a multitude of leading orchestras including the NEC Repertory Orchestra and the Massachusetts All-State Orchestra at Boston Symphony Hall
- Represented the U.S.A. while touring six European countries with the United States Youth Ensemble

SKILLS
- Comprehensive experience with medical programs including eClinicalWorks, CCC, Caregroup, and WebOMR
- Proficient in Arabic and French with a thorough understanding of Middle Eastern and Eastern European cultures

References Available Upon Request