EXAMINING PREDICTORS OF REDUCTION IN DRINKING RISK LEVEL AMONG SEVERE-RISK TRAUMA PATIENTS FOLLOWING A BRIEF COUNSELING INTERVENTION

by

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ABSTRACT

REGINA R MORO. Examining predictors of reduction in drinking risk level among severe-risk trauma patients following a brief counseling intervention. (Under the direction of Dr. LAURA VEACH)

The purpose of this study was to identify potential predictors of alcohol screening and brief intervention outcomes for severe-risk drinkers. Specifically, age, gender, race, blood alcohol level, counseling intervention type, type of injury, hazardous alcohol use, symptoms of alcohol dependence and harmful alcohol use were examined to see whether the variables were able to predict reduction to low-risk levels among severe-risk participants. A total of 101 participants were included in this research study. The variables were collected at baseline via the screening process of the alcohol screening and brief intervention (ASBI) procedures. The AUDIT (Babor et al., 2001) instrument was utilized to gather the hazardous alcohol use, symptoms of alcohol dependence, and harmful alcohol use variables. The other variables were gathered from participant self-report.

Two logistic regression analyses were conducted to analyze the data in SPSS. The analysis indicated that one variable was statistically significant, blood alcohol level. The odds ratio of .993 suggested that for every one unit increase in blood alcohol level, a severe-risk participant was .993 times as likely to reduce their drinking to low-risk at six-month follow-up. These findings show little support for the individual predictors examined within this analysis, which were all completed during the screening phase of the ASBI process. This lack of significance for individual predictors emphasizes the

need for future research to examine the components of a successful brief counseling intervention.

DEDICATION

I dedicate this educational milestone to my mom, Luann. You are an inspiration Mom; you have dedicated your life to helping people learn, and each and every day you are making this world a better place. This is a small token of my appreciation for not only believing in the good in other people, but also believing in me.

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CHAPTER 1: INTRODUCTION

It is widely acknowledged that alcohol use, even low levels, can lead to adverse health consequences. These can vary in severity, with some people not requiring external assistance, while others find themselves in inpatient hospital settings due to their complications. According to the World Health Organization (WHO, 2011) alcohol is a causal factor in over 60 types of diseases and injuries worldwide, representing the third leading risk factor. Types of diseases and injuries include that can be attributed to alcohol use include, but are not limited to, neuropsychiatric disorders, gastrointestinal diseases, cancers, intentional and unintentional injuries, cardiovascular diseases, fetal alcohol syndrome, and diabetes mellitus (WHO, 2011). Along with disease and injury, death is a major concern as a consequence from consuming alcohol. In the same report on alcohol and health consequences, the WHO (2011) states that alcohol is directly responsible for approximately 2.5 million deaths each year, being the eighth leading risk factor for death worldwide.

The numbers within the United States (US) reflect the worldwide situation. The Centers for Disease Control (2011) report that during 2009 approximately 34,000 people died in traffic-related accidents, in which alcohol played a contributory role in one third (32%) of accidents. This number reflects no difference from 2008, when 11,773 individuals were killed in alcohol-related traffic accidents (National Highway Traffic Safety Administration [NHTSA], 2009). However, it is not just alcohol-related traffic

accidents that put individuals at risk for injuries or death. Approximately 60% of burn injuries, homicides, and drowning incidents involve alcohol (National Institute on Alcohol Abuse and Alcoholism [NIAAA], 2010). Further, risky drinking puts individuals at an increased risk for heart disease, which in 2009 was the leading cause of death in the US (CDC, 2010). It is clear that consuming alcohol at risky levels puts an individual at an increased risk for health-related problems.

Along with disease, injury, and death consequences from individual consumption, alcohol is also associated with numerous psychological and sociological consequences (WHO, 2011). Examples include violence, child neglect and abuse, and employment concerns (i.e., absenteeism, tardiness). Alcohol has an economic impact of $185 billion per year in the US from medical and societal costs (Desy, Howard, Perhats, & Li, 2010).

According to the Substance Abuse and Mental Health Service Administration (SAMHSA, 2011a), 51.8% of Americans (ages 12 and older) reported consuming alcohol within the past month during the year 2010. This number is consistent with data from the 2008 and 2009 surveys (SAMSHA, 2011b). It is estimated that approximately 26% of those who do consume alcohol, do so in a risky ways (SAMHSA, 2007). Of the 26%, 3.3% of those individuals can be classified as being dependent upon alcohol, with 22.7% having no dependence, but reporting binge activity in the past year [see Figure 1].

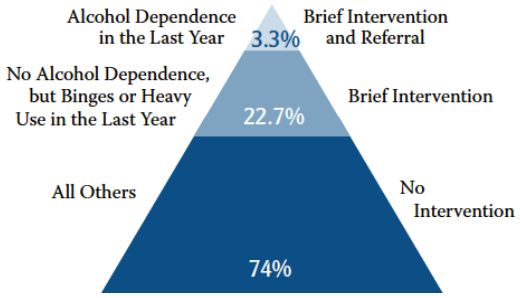


Figure 1: SAMHSA (2007), pyramid of alcohol problems

Although there are widespread statistics available concerning alcohol-related injuries and diseases, these numbers are not consistent with the numbers of individuals seeking treatment for substance use disorders. In 2010, 22.1 million Americans met the diagnostic criteria for substance abuse or dependence according to the Diagnostic and Statistical Manual of Mental Disorders, 4th edition, Text Revised ([DSM IV-TR], American Psychiatric Association [APA], 2000) (SAMSHA, 2011a). Among the 22.1 million, 67.9% (15 million) could be classified with an alcohol-specific substance use disorder (i.e., alcohol-abuse or alcohol-dependence). Of those 15 million, approximately 1.5 million received treatment in a specialty treatment center for substance disorders (SAMSHA, 2011a). That left the remaining 13.5 million Americans with an alcohol-related substance use disorder without treatment.

These 13.5 million Americans did not actively seek treatment within specialty care centers for substance issues, yet many do utilize health care services (Fleming & Manwell, 1999). Williams et al. (2010) determined that approximately 25% of all patients admitted to general hospitals have alcohol use disorders, or were injured due to risky drinking, which corresponds to an earlier estimate that 24-31% of emergency department patients (D'Onofrio & Degutis, 2004/2005). Within the primary care population, estimates suggest that approximately 15-20% of patients have alcohol-use disorders (McQuade, Levy, Yanek, Davis, & Liepman, 2000). The most significant population, by prevalence rate, is the trauma population, with upwards of 50% of patients being hospitalized as a result of injuries incurred as a result of the patient's or another individual's alcohol consumption (American College of Surgeons [ACS], 2003).

Risky Drinking Defined

Within the US population, about 70% of individuals either abstain completely from alcohol consumption, or always drink at low-risk levels (NIAAA, rethinking drinking brochure, 2010). The remaining 30% engage in risky drinking, and although the 22.1 million that can be considered to have alcohol-related substance disorders are included in this 30%, this percentage also includes others that do not meet criteria for a substance use disorder. The NIAAA define at-risk drinking as "drinking more than the single-day maximum- (three for women, four for men) or weekly amounts (seven for women, 14 for men)" (2010, p. 4). Risky drinking can be determined by using these number guidelines along with the use of screening instruments and/or blood alcohol levels. As highlighted above, risky drinking is correlated with alcohol-related injury, which is often treated via specialized trauma care. The next section will review trauma care in the United States.

Overview of Trauma Care

Throughout the US there are 109 ACS verified Level I trauma centers (ACS, 2012). These specialized care centers are able to provide services to the most severely injured patients. Motor vehicle accidents, bicycle and motorcycle crashes, gunshot wounds, stabbings, and pedestrian injuries are a sample of injuries/accidents that require specialized trauma medical attention. Approximately half of all trauma patients (50% of men, 40% of women) have alcohol in their bloodstream the time of their injury (ACS, 2006).

The complications from alcohol do not stop with being admitted to trauma centers. There is sufficient evidence to suggest that merely having alcohol in one's blood stream

at the time of injury results in higher utilization of medical resources (Roudsari, Caetano, & Field, 2011). For example, many physicians find the need to utilize more advanced techniques than would otherwise be needed to rule out injuries when patients are intoxicated. Findings also show that patients in more advanced stages of alcohol abuse may require up to twice the amount of diagnostic radiology (Skinner & Holt, 1983), imaging tests which a large percentage of trauma patients receive. Further, patients who have reached dependent levels of alcohol use are at an increased risk for alcohol withdrawal, which may result in longer hospital stay (due to needed detoxification), which only increases the patient's risk for being subject to hospital-acquired diseases (Roudsari, Caetano, & Field, 2011). Lastly, after discharge from a trauma unit, patients who initially had positive blood alcohol levels were found to be about twice as likely to return with another alcohol-related injury event (MacLeod & Hungerford, 2011), and have a 200% greater chance of unexpected death compared with trauma patients who did not have positive blood alcohol levels at the initial injury (Gentilello, 2007).

It is not surprising that alcohol has been deemed the "single greatest contributor to injury in the United States" (Desy, Howard, Perhats, & Li, 2010, p. 538). Due to the high prevalence of alcohol-related trauma injuries, the ACS (2006) now requires particular attention be directed to risky drinking in order for trauma center verification to be awarded. This policy requires all Level I and Level II trauma centers in the United States to have a mechanism in place to identify risky drinkers. Further, all Level I trauma centers must also have a mechanism in place for providing a brief intervention for individuals identified as at risk by the screening.

Screening and Brief Intervention

Considering the negative impact of alcohol worldwide, there has been a great deal of attention paid to intervention services over the past few decades. From a review of the literature concerning screening and brief intervention, it appears as though the majority of studies have been conducted in the past decade, however pioneer work goes back to the 1960's, when Chafetz et al. (1962) studied the process of referring alcoholics to treatment.

Bien, Miller, and Tonigan conducted a review of the state of brief interventions in 1993. At that time, the authors were able to locate 32 studies of brief intervention targeting alcohol-drinking behavior. From this review, the authors concluded that there is significant evidence that there is benefit for intervening with individuals to prevent further harm associated with alcohol consumption, particularly in health care settings. Of particular interest to this current proposal is the authors' comment that they located only three studies that specifically targeted the more severe-risk patients. "While the idea may be intuitively appealing that brief interventions are differentially effective for low to moderate severity cases, there are few data at present to support this assertion." (p. 331). The question remains that why, almost two decades later, is there still lack of empirical evidence that suggests eliminating this population from research on the efficacy of brief interventions?

Wilk, Jensen, and Havighurst (1997) conducted the first meta-analytic study of brief intervention efficacy. In this study, the authors targeted only randomized control trials of heavy alcohol drinkers. They found a significant association with reduction in alcohol consumption for those participants who received a brief intervention compared to those who received no intervention. These authors highlighted that their results were

limited in generalizability to the less severe drinkers. They further noted that if dependent drinkers were included in brief intervention trials, they would be at an increased risk for withdrawal or death. These comments are strong and not supported by any cited references. This comment has added to the consensus that the more severe-risk patients would not respond to a brief intervention, however, the authors did not provide documented evidence for this assertion.

Moderation of drinking behavior is only one of many outcome variables being studied in the literature of brief intervention efficacy. Within the healthcare setting, trauma specifically, rehospitalization (i.e., recidivism) has been examined. Gentilello (2007) found that compared with trauma patients who had alcohol in their system at the time of their accident and received a brief intervention, patients who did not receive a brief intervention had an almost 50% greater chance of returning to the trauma center with a subsequent alcohol-related injury. Another outcome to be examined is arrests for driving while intoxicated. Schermer, Moyers, Miller, and Bloomfield (2006) reported on the significant decrease in subsequent arrests for driving while intoxicated, following a brief intervention. Economic outcomes of brief intervention have also been reported, with Gentilello (2007) stating a net savings of $3.81 US dollars for every $1.00 US dollar spent on screening and brief intervention services. With such widely available targets for outcome data, it is clear why so much attention has been paid to screening and brief intervention efficacy.

There is strong evidence to date that brief interventions can successfully reduce individuals' alcohol consumption (Gentilello, 2005). Results have consistently shown treatment groups receiving brief interventions to reduce drinking or abstain, compared

with control groups (Bien, Miller, & Tonigan, 1993; Moyer et al. 2002). These results are further being carried into examining other outcome variables, and consistently show efficacy for brief interventions.

Significance of Study

Although there has been significant empirical attention given to screening and brief intervention, the large majority of these studies have focused on the at-risk population (Soderstrom et al., 2007; Trinks, Festin, Bendsten, & Nilsen, 2010; WHO Study Group, 1996). The more severe-risk population has been excluded purposely although there is limited evidence as to why this has been established as an acceptable procedure (Guth et al., 2008; Heather, 2004). The only documented reason found within the extensive review of the literature is that the removal of the more severe drinkers from analysis increases the effect sizes of the screening and brief intervention research (Bischof et al., 2008). There have been numerous claims made that this population, the more severe-risk, does not respond well to brief interventions (Fleming & Manwell, 1999; Soderstrom et al., 2007; World Health Organization- Brief Intervention Study Group [WHO-BISG, 1996]), however these claims are not made on the basis of empirical research (Guth et al., 2008), even lacking citations within the research reports.

In direct comparison, individuals with traumatic brain injuries (TBI) are often excluded from participation in alcohol screening and brief intervention studies (e.g., Gentilello et al., 1999; Gentilello et al., 2000; Schermer et al., 2006), although misuse of alcohol often leads to TBI (Corrigan, Bogner, Hungerford, & Schomer, 2010). The clinical understanding of brain damage leads to a general consensus that Alcohol Screening and Brief Intervention (ASBI) would not be effective for this population

(Corrigan et al., 2010), similar to the notion that it may not be appropriate for the more severe-risk drinker. Corrigan et al. (2010) argue through an analysis of peer-reviewed studies, that documented empirical evidence does not exist for whether or not ASBI may be effective for TBI patients. In conclusion, the authors state there is a drastic need for attention to this population to understand whether or not ASBI is effective for TBI patients because of the high correlation between alcohol and TBI. Further, they state that if findings suggest otherwise, accommodations should be made to make ASBI available for this population.

The current author argues the same as Corrigan and colleagues (2010), which is that there needs to be attention to the severe-risk drinking population. If ASBI, as it is conducted now, is shown not to be effective, then accommodations need to be made to reach this population. The fact remains that severe-risk drinkers present to trauma centers due to alcohol-related injury, and will have a significantly higher chance of unexpected mortality or recurrent visits to the trauma center (Gentilello, 2007). The ACS has already made significant improvement on reducing alcohol-related injury via interventions with risky drinkers (Gentilello, 2005). In order to continue with the success of recent prevention efforts, it would behoove researchers to examine this other population, who largely represent trauma patients nationwide, as found via the statistics noted above.

It is possible that the severe-risk population may be particularly well suited for brief interventions (Heather, 1995). This is because of the nature of the intervention: brief and non-confrontational. Heather (1995) cites apprehension for pursuing more long-term treatment, and limited access to traditional treatment, as two reasons for

considering this population. Further, the author highlights the ethical reasons for attending to the more severe-risk individuals, that any treatment is better than no treatment. Sanchez-Craig (1990) also states that the level of risk shall not be a determinant; however, it is the level of willingness to participate in an intervention that should guide whom receives such services. It is interesting to note that both of these authors made the claims more than fifteen years ago, and yet, the limited attention to this population has continued.

In conclusion, this study adds to the current knowledge base of ASBI services pertaining to the severe-risk drinker. The study examined a unique population that has yet to be fully examined via empirical research. The hope of this study is that it will identify potential predictors of reduction in alcohol consumption for this population, leading to a wider spread of potential services for severe-risk drinkers.

Purpose of the Research

The purpose of this dissertation was to identify potential predictors of alcohol screening and brief intervention outcomes for severe-risk drinkers. This study brings awareness to the importance of brief interventions for severe-risk drinkers, identified variables that may need different foci for the severe-risk drinker, and examined two different brief interventions that may yield important differences in response by the severe-risk drinker. Also, the analysis utilized an existing dataset, generated via a three-year randomized clinical trial, furthering resources that currently exist.

The current study utilized data from a larger study, entitled *The Teachable Moment*, that was funded by the Robert Wood Johnson Foundation and conducted from October, 2008 until December, 2011. Data were collected from consenting, adult patients

admitted to a Level I trauma center. The trauma center is housed within a large academic research hospital in a mid-sized city in the southeastern United States. The aim of this 3-year randomized clinical trial was to guide the development of alcohol screening and brief counseling intervention programs. The aims of *The Teachable Moment* sought to compare the effectiveness of two new, shorter screening tools for risky drinking patterns with the 10-item AUDIT, the longer instrument currently in use, as well as to assess the outcomes of two different brief counseling interventions conducted with hospitalized trauma patients who screened positive for risky drinking (ranging from severe to low-moderate risk).

In a review of findings with the sample of 333 enrolled subjects, *The Teachable Moment* (PI: O'Brien, CoPIs: Reboussin, Veach & Miller) examined Nursing Question 1 (NQ1) [Quantity/ Frequency Question: "On a typical day when you are drinking, how many drinks do you have?"], Nursing Question 2 (NQ2) [Drunkenness Question: "In a typical week, how many days do you get drunk?"] versus the 10-item Alcohol Use Disorders Identification Test (AUDIT) questionnaire. Compared to the AUDIT, NQ1 identified 60% of risky drinkers, and NQ2 identified 71% of risky drinkers, and produced a combined sensitivity of 83% (Positive Predictive Value, 86%) (O'Brien, Reboussin, Veach, & Miller, 2012). The two different interventions [Quantity/Frequency Intervention grounded in the NIAAA recommended consumption levels, and the other Qualitative Intervention focusing on the individual's subjective experience of getting drunk] were not found to have significant differences. This overall finding produced results that encourage further analysis of the data to examine significant differences among participants.

Research Questions

The research questions examined during this study are as follows:

1. To what extent do demographics, blood alcohol level at time of injury, presence of illegal substances in the patients' urine at time of injury, mechanism of injury, and type of intervention predict severe-risk drinkers' change in self-reported alcohol use to low-risk levels (AUDIT score <8) at six-month follow-up?
2. To what extent do hazardous alcohol use, symptoms of alcohol dependence, and harmful alcohol use predict severe-risk drinkers' change in self-reported alcohol use to low-risk levels (AUDIT <8) at six-month follow-up?

Delimitations

The delimitations of this study are as follows.

1.) The researcher is choosing to utilize a pre-established data set for this retrospective research study.

2.) The researcher is limiting the proposed analysis to one specific sample of enrolled participants, the severe-risk drinkers, and therefore results cannot be generalized to other risky drinking populations.

3.) The population is limited to those patients who were eligible at one trauma center in the Southeastern U.S.

Limitations

The limitations of this study are noted here.

1.) The results of the research are limited in generalizability, and may not be representative of all severe-risk drinkers in trauma centers nationwide.

2.) The subjective nature of some research variables (e.g., self-reported risky drinking behavior), combined with the objective nature of other variables (e.g., blood alcohol level) may result in inconsistent data.
3.) Study participants were limited to include those who only spoke English or Spanish, and therefore were not inclusive of all languages.
4.) The variables collected via participant self-report are limited due to potential reporter bias.

Assumptions

The following are the assumptions of the current research study:

1.) The data set being utilized is clean and free of errors.
2.) The participants answered all questions truthfully.
3.) The enrollment counselors were sufficiently trained in providing alcohol screening and brief intervention services.
4.) The instruments are valid and reliable.

Threats to Internal and External Validity

The following threats to internal and external validity have been identified:

Internal validity

The instruments utilized in this study are reliable and valid (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001), which leaves the main threat to internal validity being the possibility of participants' desire to appear socially desirable, and therefore, impose a self-report bias (Michael, n.d.). There has been significant research done with the instrument and found that self-report bias is limited greatly with the use of the AUDIT (Babor et al., 2001; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993).

Also, in the original study, participants consented to the study with the knowledge that none of their identifying information would be utilized, that each participant would be given a code to represent their information. These efforts were made to limit the threat that internal validity may pose with the study.

External validity

External validity generally has to do with a researcher's ability to generalize the results of a given study to a broader population. The researcher of this study was limited in the sense that patients from the original study were recruited from one trauma center, in the southeastern United States.

Operational Definitions

The following are the operational definitions that guided this research study concerning severe-risk drinkers:

Level I Medical Trauma Center is operationally defined as a specialized medical facility accredited by the American College of Surgeons that is able to provide services to the most severely injured patients, at risk of imminent loss of life or limb following a traumatic accident, such as, motor vehicle crash, assault, fall, hanging, pedestrian struck by motor vehicle, stabbing, or gunshot wound. It is not to be confused with the Emergency Department (ED) of a hospital; hospitalized trauma patients are determined to need trauma services by ED staff but receive specialized trauma care after they meet trauma care criteria.

Medical Trauma is operationally defined as an injury that results in a patient needing a highly specialized level of care (as determined by the medical staff). Injuries include, but

are not limited to, car accidents, gunshot wounds, stab wounds, bicycle crashes, assaults, suicide attempts, and burn injuries.

Risky Drinker is operationally defined as an Alcohol Use Disorders Identification Test (AUDIT) score greater than three and less than 15 for a woman (Bradley, Boyd-Wickizer, Powell, & Burman, 1998), and an AUDIT score greater than seven and less than 15 for a man (Babor et al., 2001).

Severe-Risk Drinker is operationally defined as a participant, man or woman, who met at least one of the following three criteria: 1) scored greater than or equal to 16 on the AUDIT, as according to Babor et al. (2001) these individuals warrant continued monitoring and further evaluation for possible dependence to alcohol; 2) obtained a Clinical Institute Withdrawal Assessment for Alcohol scale (CIWA-Ar) (Sullivan, Sykora, Schneiderman, Naranjo, & Sellers, 1989) score greater than seven, or 3) were administered medication in the hospital for the purpose of detoxification from alcohol.

Low-risk Drinker is operationally defined as a participant, man or woman, who scored less than eight on the AUDIT (Babor et al., 2001). According to Babor et al. (2001), individuals with scores in this range are appropriate for education about alcohol use and potential harms.

Trauma Patient is operationally defined as a hospital in-patient who is placed on the trauma service within a Level I Medical Trauma Center. They may be initially treated in an Intensive Care Unit and when stabilized, moved to a hospital floor specializing in trauma care.

Alcohol Dependence is operationally defined as meeting three or more of the criteria established by the Diagnostic and Statistical Manual, 4th edition, text-revised (APA,

2000). The criteria are: tolerance, withdrawal, increased use over longer period of time than intended, persistent desire or unsuccessful efforts to cut down or stop use, spending great amounts of time obtaining/using/recovering from alcohol, important activities are reduced or given up because of use, and continued use despite negative consequences, *Alcohol Screening* is operationally defined as a brief and valid measure able to test for problem drinking, and identifies both abuse and dependent levels when present (Bush, Kivlahan, McDonell, Fihn, & Bradley, 1998).

Brief Intervention is operationally defined as a brief contact in which an individual (e.g., professional counselor, nurse, physician, health worker) encourages a patient/client to reduce alcohol intake to non-hazardous levels, therefore reducing the harmful consequences of alcohol (Saunders et al., 1993).

Motivational Interviewing is operationally defined as the use of specific counseling techniques (i.e., open-ended questions, affirmations, reflections, and summaries) to intentionally create and foster awareness and motivation to change a risky behavior (Miller & Rollnick, 2002).

Hazardous Alcohol Use is operationally defined as the construct measured by questions one, two and three of the AUDIT instrument (Babor et al., 2001). According to Babor et al. (2001) these questions assess for a "pattern of alcohol consumption that increases the risk of harmful consequences for the user or others" (p. 5).

Symptoms of Alcohol Dependence is operationally defined as the construct measured by questions four, five and six of the AUDIT instrument (Babor et al., 2001). According to Babor et al. (2001) these questions assess for a "cluster of behavioral, cognitive, and physiological phenomena that may develop after repeated alcohol use" (p. 5).

Harmful Alcohol Use is operationally defined as the construct measured by questions seven, eight, nine and ten of the AUDIT instrument (Babor et al., 2001). According to Babor et al. (2001) these questions assess for "alcohol consumption that results in consequences to physical and mental health," along with social consequences (p. 5).

Summary

Chapter One provided background information about risky drinking and screening and brief intervention prevention efforts that are currently being undertaken worldwide. Demographic data was utilized to highlight the seriousness of the situation. Relevant policy was also discussed.

Studies that have examined the efficacy of brief interventions within healthcare settings have also been presented. These have consistently shown that brief interventions are efficacious for a variety of outcomes including, but not limited to, reduction in alcohol consumption, reduction in recurrent injury, and reduction in subsequent arrests for driving while intoxicated. Traditionally brief intervention efforts have been aimed at the less severe risky drinker, although limited empirical evidence exists to support this.

The purpose of this disseration was to determine the extent to which demographics, blood alcohol level at time of injury, presence of illegal substances in the patients' urine at time of injury, mechanism of injury, type of intervention, hazardous alcohol use, symptoms of alcohol dependence, and harmful alcohol use are able to predict significant outcomes after alcohol screening and brief intervention in severe-risk drinkers.

This dissertation is divided into five chapters. An overview of the study has been presented in Chapter One and includes an introduction to the problem, the significance of

the study, the research questions under examination, the delimitations, limitations, assumptions, and the operational definitions.

Chapter Two is a detailed review of the literature. Each variable is examined through extensive review of related empirical studies. Literature was identified through the use of multiple databases (i.e., PubMed, PsycARTICLES, PsycINFO, and MEDLINE). Also, the author utilized the reference sections of each article to further delve into the empirical literature relevant to the proposed study.

Chapter Three provides the framework of the methodology utilized. The chapter includes a description of the participants, the procedures used for data collection, a description of the instrument used for assessment, the data analytic techniques, and a summary.

Chapter Four presents the results of the statistical analyses. Descriptive statistics of the participants are presented, along with information about data screening procedures. The results of the logistic regression analyses are presented. The chapter concludes with a summary.

Chapter Five presents a discussion of the results of the research. First, there is a discussion of the descriptive statistics and the logistic regression analyses of each research question. Contributions, limitations, conclusions, and recommendations of the study will be presented. Lastly, the dissertation comes to a close with concluding remarks.

CHAPTER 2: LITERATURE REVIEW

The use of alcohol for its psychoactive properties is not a new phenomenon. Archaeological evidence of alcohol use has been found dating back to approximately 7000 BC in Japan, and 3500 BC in Iran (Inaba & Cohen, 2007). There are other historical reports that the history of alcohol dates back approximately 10-15,000 years (Inaba & Cohen, 2007; Veach, Rogers, & Essic, 2012). Although early use of alcohol may have been for nutritional purposes (Doweiko, 2002), there is a belief that the popularity of this psychoactive drug blossomed due to its mood-altering effects (Inaba & Cohen, 2007). Of all psychoactive substances in the world, alcohol has the most extensive history (Heather & Stockwell, 2004), and currently is the most widely used (Inaba & Cohen, 2007).

Along with being the most widely used psychoactive substance, alcohol is also the most widely abused drug in the world (Veach, Rogers, & Essic, 2012), resulting in 2.5 million deaths each year (World Health Organization, 2011). Specifically, this is true in the United States, where, in the year 2010, approximately 15 million people could be diagnosed with an alcohol-specific use disorder (SAMHSA, 2011a). With such widespread prevalence comes a widespread need for understanding the etiology of the disorder, and a need for understanding what may be the best way to prevent its widespread harm.

The purpose of the current study is to identify predictors of successful self-reported change in drinking behavior among severe-risk drinkers following a brief intervention in a hospital trauma center. The following chapter consists of an outline of the historical framework for the proposed study including a review of existing literature pertaining to brief counseling, treatment of alcohol use disorders and alcohol brief counseling intervention studies. Relevant empirical research of alcohol screening and brief interventions, both landmark and current studies from the past decade will be highlighted. The final section will summarize the chapter, and bring together key conclusions that have been drawn from the extensive literature review.

Historical Framework

The following section will outline the framework for the current study. A historical review of brief counseling will first be examined, along with the empirical evidence of the efficacy of such practices. The historical past of treatment for alcohol use disorders within the United States will also be examined, to lay the groundwork for understanding this growing body of literature. Lastly, brief interventions and procedures targeting alcohol misuse will be presented, including the empirical support for use of the techniques.

Brief Counseling

As the helping field has developed a rich historical past over the past two centuries, there has been an evolution of theoretical orientations and treatment approaches for counselors to utilize. Sigmund Freud's Psychoanalytic Theory is recognized as the historical foundation of current counseling and psychology (Seligman & Reichenberg, 2010; Talmon, 1990). There is a general consensus among counselors

that traditional counseling rooted in psychoanalytic principles embraced lengthy treatment plans, whereas the more recent trend has been developing time-limited, brief counseling models. This is a great misconception, as numerous authors have discovered counseling was time limited towards the beginning of the 20th century, and that even Freud did not initially embrace year long treatments (Barten, 1971; Budman & Gurman, 1988; Small, 1979; Talmon, 1990). Historical evidence suggests Freud originally embraced a brief therapeutic approach (Budman & Gurman, 1988; Small, 1979). Talmon (1990) describes two patients in which Freud utilized a single-session approach and found success. Although these single-session treatments occurred and he reported success, it was more likely that his original approach consisted of counseling that lasted weeks, or possibly months (Budman & Gurman, 1988). It did not however consist of three-to-five years that many modern counselors associate with Freud (Seligman & Reichenberg, 2010). It was only when Freud and his colleagues expanded the complexity of psychoanalysis that the treatment period lengthened (Budman & Gurman, 1988). According to Small (1979) the initial goal of counseling was to identify a quick diagnosis of the roots of the issue that could then be actively interpreted, and as a result of the interpretation, the client would be healed.

The Community Mental Health Act of 1964, requiring that emergency mental health services be available in U.S. community centers receiving federal funding, has been identified as one major reason for the substantial increase in attention to brief therapeutic approaches in the later part of the 20th century (Barten, 1971; Small, 1979). Other factors that have been identified include the desire to reach a lower socioeconomic population, the coverage of services by health insurance companies, a growing interest in

prevention of mental health disorders (Barten, 1971; Small, 1979) and an identified need to reduce waiting times for individuals whom desire counseling (Wolberg, 1965). Also, in combination with the above reasons, the significant empirical evidence of successful outcomes has been largely responsible for the rise in popularity of brief approaches (Budman & Gurman, 1988; Weakland, Fisch, Watzlawick, & Bodin, 1974).

The key components of brief counseling models have not always been made precisely clear to readers (Small, 1979). Barten (1971) offers a framework for brief counseling, beginning with the notion that treatment will be time-limited, and that both the counselor and the client are aware and agree on this. Within the literature on session limit, there is a general consistency that between 1 and 20 sessions is considered brief. Some authors are much more stringent, calling for a one session maximum (Talmon, 1990), where others are much more lenient with 40 continuing to represent brief counseling (Small, 1979).

Budman and Gurman (1988) argue that it is not time limits that make a treatment brief, however, it is the values and attitudes of the counselors. Budman and Gurman further state that there are distinct values that brief counselors embody, which enables the treatment to follow a brief model. Such values include beginning with the least complicated therapeutic approach, a belief that change in one area of one's life can impact another area, embracing of a health orientation as compared with an illness orientation, and a belief that not all individuals who request treatment may be ready for it, or suited for it (Budman & Gurman, 1988). Talmon (1990) further supports the notion that attitudes and values of the counselor are vitally important for the success of brief counseling, in particular single-session counseling. In sum, the counselor needs to

believe in and trust this therapeutic process, just as counselors need to believe in and trust whichever theoretical orientation guides them.

Budman and Gurman's (1988) first value statement is interesting and directly applicable to the addiction field: "The brief [counselor] begins treatment by using the least radical procedure; that is, [counseling] begins with the least costly, least complicated and least invasive treatment" (p. 13). This statement is directly aligned with the American Society for Addiction Medicine's (ASAM) Patient Placement guidelines, 2nd ed.-revised (Mee-Lee, Shulman, Fishman, Gastfriend, & Griffith, 2011) for leveled care for substance abuse treatment in the United States. The guidelines suggest different treatments (e.g., intensive outpatient, inpatient, detoxification) for individuals based on a variety of factors. Whether individuals have been in treatment before, have a supportive external environment, and are individually motivated all play a key role in determination of treatment setting likely to produce successful outcomes. In similarity to Budman and Gurman's statement, the ASAM criteria states that treatment should begin with the least invasive approach.

The field of family counseling has been significantly influential with the growth of brief counseling approaches. Traditionally, family counseling has been time-limited, due to the overwhelming majority of presenting issues being related to a current crisis the family is experiencing (e.g., infidelity, divorce, death of a family member, or substance abuse) (Seligman & Reichenberg, 2010). The Palo Alto Group, located at the Mental Research Institute in Palo Alto, CA, was the birthplace of much of the thinking concerning brief counseling, in particular problem-focused work (Fisch, Weakland, & Segal, 1982; Watzlawick, Weakland, & Fisch, 1967). Problem-focused therapy

conceptualizes problems as a cyclical process of repeatedly using the same failed attempt to solve a problem. Solution-Focused Brief Therapy (SFBT) grew out of this problem-focused therapy by proposing that the solution to the problem lies within the problem itself (de Shazer, 1988).

As the name of the SFBT suggests, the focus of the counseling process is placed on helping clients develop solutions, many times using what has worked for them in the past, as opposed to focusing on the problem which has gotten the individual and/or family into counseling. Treatment of presenting issues is said to begin before an individual enters into the first counseling session. As soon as clients make the decision to pursue a counseling relationship, they are in fact deciding to begin creating solutions in their lives. This approach to counseling has a strong foundation in constructivism (i.e., the notion that reality is a constructed concept of society rather than an objective reality) (Weishaar, 1993).

Since the later part of the 20th century, the field of counseling has seen a growth in brief treatment models. Approaches such as Solution-Focused Brief Therapy (De Shazer, 1985), Neuro-Linguistic Programming (Bandler & Grinder, 1982) rooted in Watzlawick, Beavin, and Jackson's (1967) notions of human communication, Eye Movement Desensitization and Reprocessing, EMDR (Shapiro, 1991), and Motivational Interviewing, MI (Miller & Rollnick, 1991) are a few. Budman and Gurman (1988) support the notion that there is not one specific model of brief counseling that will result in more positive outcomes over another. However, Motivational Interviewing has been identified in the addictions field, and particularly the screening and brief intervention field, as a treatment framework of choice, due to strong empirical support with this

population (Hettema, Stelle, & Miller, 2005; Nowinski & Baker, 2003; Project MATCH Research Group, 1997, 1998a, 1998b).

Empirical outcomes of brief counseling. Identification of historical research that states the focus of research was solely on brief counseling has been difficult (Budman & Gurman, 1988). Budman and Gurman (1988) state that because of the historical past of counseling being rooted in brief processes, the original reviews of the efficacy were in actuality "unacknowledged review[s] of time-limited brief [counseling]" (p.7). These authors further state that the research findings suggest significant evidence of the effectiveness of brief counseling, with between two-thirds and three-fourths of treated clients reporting successful outcomes (i.e., a reduction in symptoms).

Talmon (1990) describes the development of his own interest in single-session counseling stemming from an interaction with a clinical director and his clinic's reported numbers. Talmon found that suprisingly, the modal number of length of counseling was one session, and that even when the second session was free or a reduced price, individuals did not return. He continued his research, and after calling 200 of his own patients whom he met with for one session, 78% of the patients stated that they had gotten what they needed from the single session. These numbers, according to Talmon, reflect what other researchers (i.e., Bloom, 1981; Kogan, 1957; Silverman & Beech, 1979) were reporting about single session counseling at the time: single session was sufficient, from the perspective of the clients served.

Budman and Gurman (1988) reviewed several analyses, which examined client symptom reduction over the course of treatment episodes. What the authors found was that the longer an individual was in treatment the greater the reduction in symptoms,

however, there was an overall disproportionate reduction in symptoms between sessions six and eight (Budman & Gurman, 1988). The authors report a continued, however, less drastic reduction in symptoms. Budman and Gurman (1988) further question whether or not this continued reduction occurs with others who terminate treatment. Regardless of whether symptom reduction has occurred, these authors report that the average length of time that individuals stay in treatment is six-to-eight sessions. It is not reported by the authors what leads to the termination of counseling, just that there is a correlation between this average length of stay, and the average time for reduction in symptoms to occur.

Brief counseling has emerged as a distinct therapeutic approach, similar to Cognitive-Behavioral Therapy (CBT) (Beck, 1976), Rational Emotive Behavior Therapy (Ellis, 1973), and Gestalt Therapy (Perls, 1973). Not only has the field of brief counseling grown in popularity; however, other theories have been adapted to align with a briefer approach. For example, CBT (Beck, 1976; Meichenbaum, 1977) has been adapted into a Cognitive-Behavioral manualized treatment for children and parents lasting from 12-16 weeks (Cohen, Mannarino, & Deblinger, 2006). This approach utilizes the foundation of CBT but specifically delineates each session's content for the counselor. SFBT has also been implemented into a variety of different settings, including the prison system (Lindfoss & Magnusson, 1997) and a career counseling setting (Burwell & Chen, 2006).

Brief counseling has deep roots within the counseling profession, in both practice and theory. Historical developments such as the Community Mental Health Act of 1964 and the more recent emphasis to lower cost and still provide effective treatment has

contributed to the rise in popularity of this type of counseling. Brief counseling has been embraced, in large part due to the strong empirical findings of efficacy. In a similar way that the counseling profession has embraced briefer approaches, the field of alcohol treatment has also embraced shorter approaches. Not only has this been because of the need to reduce costs, but also the strong empirical support for brief treatments in comparison to long-term intensive treatments. The next section will outline the historical treatment of alcohol use disorders, with particular focus on the changing dynamics of treatment.

Historical Treatment of Alcohol Use Disorders

Treatment for alcohol use disorders within the United States dates back to the late 18th century with the original works of Dr. Benjamin Rush, the first U.S. Surgeon General (Inaba & Cohen, 2007). In 1784, Dr. Rush produced his landmark manuscript, outlining the effects of alcohol on the body and mind (Thombs, 2006). Also included within this writing was a list of "remedies for the evils which are brought on by the excessive use of distilled spirits" (Rush, 1823, p. 28). Dr. Rush's work has been acknowledged as the first recognition of alcoholism as a disease (Inaba & Cohen, 2007; Thombs, 2006). Other well-known icons of alcohol treatment in the United States include: E.M. Jellinek, Dr. Thomas Trotter, Bill Wilson, and Dr. Bob Smith (Inaba & Cohen, 2007; White, 1998).

Over the past two hundred years, there have been many different attempts to treat the alcoholic. As previously mentioned, the beginning of the treatment phase in the United States has been recognized as Dr. Rush's acknowledgement of the disease (Thombs, 2006). Following closely on his heels came the Washingtonian Movement and

the Temperance Movement (White, 1998). The Temperance Movement lasted significantly longer than the Washingtonian Movement, which died out by the mid-1850s (White, 1998). The original goal of the longer lasting Temperance Movement was to encourage moderation of alcohol consumption, however, the goal eventually turned to abstinence (White, 1998). Temperance organizations (e.g., The Washingtonian Temperance Society, Women's Christian Temperance Union, Sons of Temperance, Order of Good Templars, National Temple of Honor; Order of Friends of Temperance) sprung up throughout the United States, most prolifically in Boston, Massachusetts (Spicer, 1993; White, 1998). These original organizations were the first to be recognized as mutual-aid movements, with those afflicted by the disease taking responsibility for helping others cope with the disease.

White (1998) states that the second half of the 19th century was marked by a stark increase in the number of institutions dedicated to the treatment of alcoholism. In 1870, the American Association for the Cure of the Inebriates was established (White, 1998); that year there were six facilities nationwide to treat the disease of alcoholism. That number increased more than 400% to 32 facilities within six years, and with continued growth into the 20th century there were over one hundred facilities in the year 1902 (White, 1998). These facilities went by many different names (e.g., lodging houses, inebriate homes, inebriate asylums, inebriate farms, and reformatories) but mainly fell into two types (White, 1998). The term "homes" referred to those that engaged in very minimal treatment activities, which provide room and board, and the "asylums," which were much more directed by a medical model (White, 1998, p.23).

The early 19th century was marked by numerous varied attempts to help cure the disease of alcoholism. These attempts included natural therapies (i.e., specialized diets, exercise, leisure), convulsive therapies, massage treatment, oxygen treatment, glucose and insulin injections, and even the infamous lobotomy era (White, 1998). There were also efforts to sterilize (i.e., reproductive sterilization) alcoholics via the Eugenics movement, and a period in which alcoholics were infected with Gonorrhea (White, 1998).

One treatment program was opened in 1906 that differed from all the others; this was the Emmanuel Clinic (White, 1998). What made this clinic different was the embracing of multiple disciplines (i.e., religion, medicine, and psychology) to care for the patients. According to White (1998) the Emmanuel Clinic integrated many of the elements that are common in mainstream addiction counseling (e.g., medical screening, psychological counseling, mutual-support structure) and the integration of certain elements (e.g., self-inventory and confession) that "foreshadowed the Oxford Groups and Alcoholics Anonymous" (p.100). The clinic also used individuals in recovery from addiction as counselors, in conjunction with formally trained psychologists and social workers. The Emmanuel Clinic is recognized as the beginning of the "lay therapy movement" where these individuals in recovery were fully embraced as part of the treatment team (White, 1998, p. 100). Although this clinic and the following movement appear to have laid the foundation for modern alcohol treatment, White reports that this growth stalled following the death of Dr. Elwood Worcester, one of the founders, in the middle of the 20th century.

Also of significance to the treatment history of alcoholism was that in 1920, the most prolific public policy concerning alcohol went into effect: Prohibition. Prohibition

made the possession of and distribution of alcoholic beverages illegal in the United States. Although this curtailed mainstream alcohol consumption, it drove those that suffered from the disease of alcoholism further into hiding and increased the shame and negative stigma that continue today (Spicer, 1993). Thirteen long years later, the 18th Amendment (i.e., Prohibition) was repealed. This was followed closely by the forming of Alcoholics Anonymous (AA) in 1935. To this day, AA remains a significant resource that is encouraged by many alcohol treatment centers, in both self-sustaining groups, and Minnesota Model treatment programs. These programs include Twelve Step Facilitation counseling approaches while respecting the clear boundaries noted within the 12 Traditions, that AA (or any 12 Step Group) does not affiliate with any particular treatment approach or program; nor does it consider itself a treatment approach (Thombs, 2006).

A pivotal transformation in the treatment of alcoholics in the United States came in the late 1940s and early 1950s. Following closely on the heels of the AA movement came the rise of the Minnesota Model (Spicer, 1993). Instead of prisons, local jails, or mental psychiatric wards of state hospitals, addicts were given a place to live in which their addiction was embraced fully as a disease, and they were subsequently given tools to learn how to cope with this illness (Spicer, 1993). These places were named Pioneer House, Hazelden, and Willmar State Hospital, and were located in the state of Minnesota.

Similar to the Emmanuel Clinic, the Minnesota Model emphasized a multidisciplinary approach to alcohol treatment (Spicer, 1993). The programs fused medical care with clinical psychology, while encouraging attendance at lectures about the 12 steps of AA (Hazelden, 2012). The model emphasized a comprehensive body, mind,

and spirit approach to addiction (Hazelden, 2012). Examples of professionals currently employed in Minnesota Model treatment programs include: physicians, psychologists, social workers, nurses, licensed addiction counselors, pastoral counselors, and spiritual directors, all of whom may or may not be in recovery themselves (Hazelden, 2012). According to Spicer (1993) the Minnesota Model embraced three core principles: "Treat people with chemical dependency. Treat them with dignity. Treat them as whole persons- body, mind, and spirit" (p. 47). Spicer comments that the components of the Minnesota Model are not original, however, the model did make original the idea of combining such multidisciplinary components, and being flexible with what individual persons need for their recovery to be effective. The notion of rehabilitation provides the support of the model; the goal is to promote long-term change, not just abstinence as is mistakenly emphasized in some literature. This is accomplished through many different modes, with the combination looking different for each and every person who enters as a client. The Minnesota Model embraces comprehensive person-centered care, which perhaps the reason it one of the most widely used models in addiction treatment (Doweiko, 2002; Rogers & Cobia, 2008).

The growth of the Minnesota Model and the popularity of AA soared through the mid-20th century. This growth took a dramatic downturn in the 1980s in part from presidential policy and also from cost containment efforts (Spicer, 1993). During the 1980's there was a drastic reduction of budgets for health agencies, including the National Institute of Alcohol Abuse and Alcoholism (NIAAA), the national leader in research and prevention efforts, leaving the independent states to deal with this social problem with decreased federal support.

The other issue facing treatment of addiction was the use of managed care organizations (Spicer, 1993). These organizations (e.g., health maintenance organizations [HMOs], preferred provider organizations [PPOs]) have an overall goal of reducing health care costs, but as a result, began to restrict the type of care that is available to patients (Spicer, 1993). Particularly relevant for the Minnesota Model of addiction treatment was that managed care organizations became much less likely to pay for intense inpatient treatment while an alternative outpatient care existed. There was a sharp decline in inpatient admission rates during this period (Spicer, 1993). Spicer (1993) notes that this attitude resulted from a large discrepancy between rehabilitation models of recovery and medical models of recovery. Managed care organizations restricted inpatient access to patients who were medically disabled enough to require that level of care, where the rehabilitation model requires patients to be intellectually alert, ambulatory, and able to perform regular self-care (Spicer, 1993). Spicer argues that inpatient treatment is not the only way to receive treatment, however, due to these policy and organizational shifts in health care, access to it was limited even for those that who would have benefited from it.

There have been two main constants throughout the history of treatment of alcohol disorders within the United States: ambivalence and stigma (Spicer, 1993;White, 1998). Although the Moral Model of alcohol consumption strictly views its use as evil (Thombs, 2006), overall, it appears as though moderate drinking is seen, and has been throughout history, as a socially acceptable behavior. It is when the drinking becomes out-of-control, that the stigma of the negative attitudes is cast upon the individual. According to Spicer (1993):

> Recovering people still face waves of discrimination. They find it hard to secure life, health, and disability insurance; they struggle with whether to reveal their treatment history to prospective employers and landlords; and they may be denied federal benefits for education and housing even if they've been sober for years (p. 71). Oversimplifying a bit, we can say that our attitude toward drinking has two distinct poles: we love it, and we loathe it (p. 25).

The ambivalence and stigma, according to Spicer (1993), is what makes alcohol policy development, and treatment of the disease so difficult.

Within the US, substance abuse treatment has typically been directed at two main fronts. The following review has consisted of coverage of one of these, the treatment for individuals with active disorders. The other focus of attention in relation to substance abuse disorders is the prevention of the development of the disorders. A widely acknowledged gap exists between these two fronts, with most prevention efforts occurring in early-middle childhood, and then the treatment phase typically coming about years later. The general consensus appears to be that all efforts will be made to deter individuals from using and abusing substances early in life, but that professionals will then have to sit back and wait for those who present for treatment when the prevention efforts failed. Historical treatment efforts certainly have not been in vain, and neither have prevention efforts. Traditional prevention efforts are primarily focused on children and adolescents. The benefits of early prevention efforts have been mixed, however tobacco prevention efforts have been the leader of these efforts (Riordan, 2012).

The treatment of alcohol use disorders has evolved greatly over the past two centuries. Traditionally an individual needing treatment has needed to seek the external assistance via treatment programs. In more recent years, there has been an increase in efforts to reach individuals before they need to present to inpatient treatment programs. In a sense, the prevention aspects of substance abuse programs have been expanded, in

hopes to prevent the disease of addiction from progressing to a point where the only option is inpatient treatment, which the individual needs to seek out. What makes hospital based treatment interventions (specifically, trauma center interventions) unique is that the treatment is brought to the individual. This type of treatment embraces the interdisciplinary team established by the Emmanuel Clinic (White, 1998), and the Minnesota Model (Spicer, 1993), and implements it into the unique, opportunistic setting of hospital healthcare.

Empirical outcomes of historical alcohol treatment. The research history into treating alcohol use disorders shares a similar rich past, although not so lengthy. With the 1940s came the creation of the first academic center to do serious research on alcoholism, i.e., The Yale Center for Alcohol Studies (Spicer, 1993). The National Committee on Education on Alcoholism, and also the National States Conference on Alcoholism were also both formed during this pivotal decade (Spicer, 1993). In 1970, the Comprehensive Alcohol Abuse and Alcoholism Prevention and Treatment Act was passed (White, 1998). This piece of legislation decriminalized public drunkenness and also established the National Institute of Alcohol Abuse and Alcoholism (NIAAA). This organization was formed to implement the new legislation, and did this by creating national programs for alcoholism, education, training, and research (Spicer, 1993; White, 1998). By 1975, the NIAAA had started or supported over 600 community-based treatment programs, a number quadrupled within two years, to over 2400 programs.

The year following the creation of the NIAAA, the Rand Report was published (Armor, Polich, & Stambul, 1976). This historical report was funded by the NIAAA, and was devoted to the study of alcoholism and the treatment of it throughout the United

States. All nationally funded treatment programs were required at the time to collect intake data from all patients seeking treatment, and again at six months following the initial intake. Results from the study highlighted a 70% rate of remission following treatment (Armor et al., 1976). Further results proved to be controversial with the agency finding that some of the participants reported controlled drinking at follow-up (Armor et al., 1976). The authors also found that untreated clients whom participated actively in Alcoholics Anonymous reported a similar 70% remission rate, suggesting that formal treatment may not be necessary for all. Armor et al. (1979) further found that within the treated population under study, there was no difference between the formal treatments (i.e., hospitals, halfway houses, or group counseling). Armor et al. note that because the results of the Rand Report are observational in nature, and not experimental, they need to be interpreted with caution. For example, individuals may have self-selected into the most appropriate treatment for themselves, and that this potentially influenced the high remission rate. This study, although potentially leading to more confusion surrounding identifying the appropriate treatment setting, is encouraging for individuals looking to expand treatment to unique settings.

In the mid-1980s, the Hazelden Evaluation Consortium conducted a study on treatment outcomes across all 14 sites representing the consortium (Spicer, 1993). Inclusion criteria for the alcoholism treatment centers to be included within the study was that they had to have an average stay of 28 days, along with at least 85% of patients discharged with staff approval (Spicer, 1993). Individuals who completed treatment were surveyed at two time points, six and twelve months following discharge (Spicer, 1993). The results suggested that at six months, 64% of patients reported abstinence, with 54%

reporting abstinence at 12 month follow-up. In addition, 51% of patients reported attendance at Alcoholics Anonymous meetings at six months, with that number decreasing to 39% at 12-months. Patients consistently rated their quality of life to be much higher (6 months-82%; 12 months-79%) following discharge (Spicer, 1993). Spicer (1993) emphasizes the importance of remaining flexible with the definition of "recovery" as it is a process individuals go through. This flexibility does make the notion of research more difficult, however, the study conducted by the Hazelden Evaluation Consortium did produce positive and encouraging results for the Minnesota Model (Spicer, 1993).

One of the most significant empirical investigations into treating alcohol-specific addiction was Project MATCH (Project MATCH Research Group, 1997, 1998a, 1998b). The project's aim was to identify whether matching patients to three different types of treatment (i.e., Cognitive-Behavioral Therapy [CBT], Twelve-Step Facilitation [TSF], and Motivational Enhancement Therapy [MET]) based on patient characteristics would increase treatment outcomes (Project MATCH Research Group, 1998a, 1998b). The three treatment approaches were administered over a 12-week period, with the CBT and TSF treatments being administered in 12 individual weekly sessions, and the MET treatment being administered in four total individual sessions at the first, second, sixth and twelfth week of the study (Project MATCH Research Group, 1997).

Each of the three approaches utilized have foundations in sound theoretical approaches to counseling. CBT has been identified as an empirically valid approach to counseling emphasizing attention to thoughts, feelings, and behaviors (Beck, 1976). The TSF utilized during Project MATCH differs from that introduced via the Minnesota

Model. The most distinguishing differences being that the TSF approach within the Project MATCH study was provided in individual sessions (Nowinski & Baker, 2003), which contrasts from the group approach of Minnesota Model TSF. Also the TSF within Project MATCH was provided once a week, where in traditional programs, particularly the Minnesota Model, intensive group counseling is frequently at least 5 times per week; this is particularly important for individuals in early recovery, when individuals are encouraged to attend 90 meetings in 90 days. According to the Project MATCH research protocol, TSF involved the use of twelve set sessions, covering topics such as acceptance, surrender, people-places-routines, moral inventories, and other relevant topics (Nowinski & Baker, 2003) whereas usually in the Minnesota Model these topics are covered in group counseling every day in a 28-day residential program or five days/week for multiple weeks in a partial hospitalization program for addiction. MET, rooted in Motivational Interviewing (Miller & Rollnick, 1991), is based in client-centered counseling (Rogers, 1957) and the Transtheoretical Theory of Change (Prochaska & DiClemente, 1983). The approach acknowledges where individuals are on the stage of change continuum (i.e., pre-contemplation, contemplation, preparation, action, or maintenance), and rolls with any resistance that may emerge while discussing thoughts about making a change. Each approach is unique and empirically valid.

Although small findings suggested CBT and TSF over MET during the 12-week treatment, this finding was not supported at one-year follow-up. Although there was no significant difference in success rates of the three treatment groups (Heather, 2004), there was support for the use of TSF, as participants in that group were found to have reported a slightly higher percentage of alcohol abstinent days. There was no difference between

treatment groups on the other main variable, drinks per drinking days. What makes this important for the screening and brief intervention field is that the MET format proved to be just as good as the other two treatment approaches, although with one-third the amount of contact. Just as brief counseling was found to be a beneficial alternative to long-term psychoanalysis, the results of this study highlight that alternatives are possible, and encouraging.

Historical Predictors of Treatment Effectiveness. Although Project MATCH failed to produce support for the patient matching hypotheses proposed (Project MATCH Research Group, 1998a), other empirical investigations have produced significant findings of predictors for treatment success (Brown, 2004). The following section will highlight the results of predictive studies indicating which factors have been found to contribute to successful reduction in symptomology.

A significant literature base exists examining predictors of substance abuse, and more specifically, alcohol treatment. Maisto, Sobell and Sobell (1980) conducted an investigation to determine predictors of abstinence and non-problem drinking outcomes following two treatment programs, one abstinence driven, the other a controlled drinking program. Four variables were identified to account for controlled drinking outcomes: years of education, alcohol-related hospitalizations, controlled drinking goal, and days functioning well at 13-18 months. There was a negative relationship found between the total number of alcohol-related hospitalizations and the ability to maintain controlled drinking at follow-up, suggesting those with more severe medical complications from alcohol are less able to consume alcohol in controlled ways. Maisto et al. (1980)

conclude that this is due to an increased severity of addiction with this population, and that the best candidates for controlled drinking are those with less severity.

Ornstein and Cherepon (1985) investigated particular demographic variables influence on drinking behavior following a 30-day inpatient alcohol treatment program. Male veterans (N=1210) were enrolled into the study and followed for a two-year period. The authors determined that there were two types of participants following participation: responders and non-responders. Responders were those who reported abstinence or improved drinking that was five percent of their pretreatment drinking rates. Non-responders exceeded that five percent limit, were unimproved, were deceased, or had insufficient information after their release to determine success. Correlation analysis results revealed that the participants who were found to respond to treatment were older, had longer stays in the treatment program, had fewer previous hospital admissions for alcoholism complications, visited the program more frequently after discharge, and had more days of sobriety before treatment. The best discriminating variables to determine responders versus non-responders were whether the participants became involved in the aftercare program, and the degree to which they became involved in the aftercare program. Ornstein and Cherepon (1985) did not find that the length of an individual's stay in the treatment program predicted his treatment outcome, and noted this was in contrast to other studies (i.e., Ferneau & Desroches, 1969; Finney et al., 1981; Welte et al., 1981) supporting this notion. It is important to note that although the days spent in treatment differ from involvement in an aftercare program, the second variable was shown to be of significance, suggesting involvement in treatment to be an important variable for consideration.

Other variables that have been found to predict treatment success (as measured by treatment involvement, reduction in alcohol consumption, and/or abstinence) include: longer lengths of stay within treatment (Ferneau & Desroches, 1969; Finney et al., 1981; Welte et al., 1981), establishing a substitute for the dependence, compulsory supervision, the forming of new, stable relationships, group membership (Valliant, 1988), stable family organization, no family history of alcohol problems (Valliant, 2003), increased involvement within the treatment program, being male (Bottlender & Soyka, 2005), having stable employment, and middle-upper class socioeconomic status (Adamson, Sellman, & Frampton, 2009). According to Edwards et al. (1988) the interest in examining predictors is not only to inform what type of treatment may be most appropriate for an individual, but also for contributing to the theoretical base of addiction knowledge. Further, Adamson et al. (2009) suggest that prediction research also can help improve the accuracy of prognosis, and identify areas to target within treatment.

Alcohol treatment has continually evolved throughout the history of the US. More changes came during the later part of the 20th century, with a significant driving force behind this to make treatment shorter and more effective (Spicer, 1993). Another evolution of substance abuse treatment has been the use of interventions. According to the Hazelden foundation (2012):

> The overall objective of an intervention is to confront a person in a non-threatening way and allow them to see their self-destructive behavior, and how it affects themselves, family and friends. It usually involves several people who have prepared themselves to talk to a person who has been engaging in some sort of self-destructive behavior. In a clear and respectful way, they inform the person of factual information regarding his or her behavior and how it may have affected them. The immediate objective of an intervention is for the self-destructive person to listen and to accept help. (para. 1).

The use of interventions has challenged the idea that an individual needs to be at the lowest point (also referred to as "rock bottom") for them to finally accept help. According to Hazelden (2012) individuals have found success within treatment following a brief intervention.

Brief interventions built upon the success of the intervention efforts described by Hazelden (2012). These have further sped up this time frame for intervening with problem alcohol use. Just as interventions provided in consultation with a counselor encourage individuals to seek treatment for a current disorder and can bring about successful changes before rock bottom occurs, brief interventions have been proven to be a key prevention measure, reducing problematic drinking and resulting consequences (Bien et al., 1993; Wilk et al., 1997).

Brief Interventions

Due to the wide variation of models of brief counseling and resulting confusion among practitioners at times, it was important early on to distinguish what is contained in a brief counseling intervention. There is still ambiguity for how individuals chose to conduct the interventions, as there are no set guidelines, however, specific frameworks have been suggested. One model particularly relevant to the current research is the Brief Negotiated Interview (BNI), developed by D'Onofrio, Pantalon, Degutis, Fiellin, and O'Connor (2005) for use by emergency department (ED) personnel. The authors consulted with Dr. Miller, one of the founders of Motivational Interviewing, and produced a protocol and corresponding checklist to identify that the main components of the BNI was completed. According to D'Onofrio et al. (2005) the BNI has four critical components: "1) Raise the subject of alcohol consumption; 2) Provide feedback on the

patient's drinking levels and effects; 3) Enhance motivation to reduce drinking; and 4) Negotiate and advise a plan of action" (D'Onofrio et al., 2005, p. 3). After developing and testing the BNI using standardized patients, the researchers concluded that the BNI is an acceptable method to deliver brief alcohol interventions in the emergency department with providers successfully implementing the BNI procedures in approximately 10-minute sessions.

Another widely used brief intervention framework is the FRAMES model which was developed by Miller and Sanchez (1993) after reviewing and identifying key elements that were shown to be the most effective components. According to Bien et al. (1993) these six specific elements are present during an effective brief intervention: feedback, responsibility, advice, menu, empathy, and self-efficacy. The feedback element involves the provider discussing the patient's personal risk factor or impairment level due to alcohol consumption levels. The second element is that of responsibility; that it is the patient's personal responsibility for change, building that individual's sense of personal control in relation to making a change. Advice involves an explicit message to the patient, either written or verbal, that a change is necessary. The menu component involves making available a variety of suggested change activities the individual may consider, while remembering that the responsibility is up to the patient to decide what would be most appropriate for him/her. Empathy is a crucial element included within the FRAMES model; an attitude of warmth, reflective and understanding is key to establish empathy within the brief intervention. Lastly within the FRAMES model is the enhancement of patient self-efficacy, building the notion that change is possible. The

FRAMES model as proposed by Miller and Sanchez offers a blueprint of six elements that have been found to produce change following brief interventions.

The notion of empathy as a key element of brief interventions is crucial for the counseling profession in particular. Counselors receive hundreds of hours of training both in coursework and clinical placements, with an immense amount of attention focused on understanding empathy and embracing this within the therapeutic relationship. This attention is rooted in Carl Rogers' (1957) core conditions of the therapeutic relationship: genuineness, unconditional positive regard, and empathy. Counselors whom embody these conditions show high success rates however it is not only using the skills associated with the conditions, but also embodying the conditions (Miller & Rollnick, 2002). According to Miller and Rollnick (2002), "It is love, and profound respect that are the music in motivational interviewing, without which the words are empty" (p. 13). This statement exemplifies why breaking down the brief intervention into core elements is difficult and confounded, particularly when different providers are unique and follow their own inner music.

Just as brief counseling has grown in popularity among the general helping profession, it is becoming increasingly recognized within the addiction counseling field as an effective treatment approach. Edwards et al. (1977) conducted the first empirical investigation into the efficacy of brief treatment for alcoholism (Heather, 2004). In this study, participants first underwent a three-hour assessment, and were randomized into either a traditional treatment group, or to a single-session treatment group. Edwards and his colleagues enrolled 100 male alcoholics in this study and successfully completed follow-up at 12-months with 94 of them. There was no significant difference in

outcomes between the two groups at follow-up. Although not statistically significant, these results were incredibly significant in that they questioned much in regards to traditional treatment for this severe population. The researchers also asked participants some subjective questions about their experiences participating in the study at follow-up. The participants stated that one of the major factors in their reduction in alcohol consumption was the one counseling session. These same participants were followed up 12 years after the original study, and the lack of difference between treatment groups remained consistent (Heather, 2004).

Although there have been significant outcomes for individuals enrolled in traditional treatment programs, the fact remains that the majority of individuals with alcohol use disorders do not actively seek treatment (SAMHSA, 2011a). It is imperative that newer unique treatments be established to reach these individuals. Developing new treatments involves not only focusing on content, and structure of the treatment, but also on identifying appropriate settings. Health care settings present a unique opportunity to intervene with individuals with health-related consequences of drinking who are not actively seeking help. The following review will outline the empirical findings of alcohol intervention programs within health care settings.

Alcohol Treatment within Healthcare Settings

Patients admitted to general hospital settings for medical conditions (e.g., appendicitis, heart conditions, or cyst removal) or those visiting their primary care physician do not typically receive specialized attention to alcohol issues, however, numerous patients either have alcohol-use disorders, or are hospitalized due to their drinking behavior (D'Onofrio & Degutis, 2004/2005; McQuade, Levy, Yanek, Davis, &

Liepman, 2000; Williams et al., 2010). Due to these high prevalence rates (i.e., 25% of general hospital inpatients, 25-31% of ED patients, and 40-50% of trauma patients), there has been a demand to attend to this causal factor in disease and injury. The field of Alcohol Screening and Brief Intervention (ASBI) has grown tremendously in response to this demand, with numerous professional disciplines (e.g., public health, medicine, nursing, and counseling) responding.

Alcohol Screening and Brief Intervention in General Hospital Non-Trauma Settings

Chafetz et al. (1962) conducted the first empirical study of intervening with adult alcohol abusers in a general hospital setting. After conducting a survey of the prevalence of alcoholism within general hospitals, the authors state that over 1200 patients met criteria for dependence at the time, while less than one percent of them sought treatment for their disease. The authors went on to conduct an empirical investigation of the referral process for alcoholics after being admitted into a hospital setting. The authors found that an emphasis on an empathic counseling style contributed to a 65% rate of follow-through with a referral to a specialist, compared to a 5% completion rate for the control group. The results of this original study by Chafetz were replicated with greater success, finding that 78% percent of those receiving a brief counseling intervention kept their referral appointment (Chafetz et al., 1964). The staggering results highlighted that the brief counseling session had a significant impact in increasing completion rates with the referral process.

As previously mentioned, Edwards and colleagues (1977) conducted a brief intervention with alcoholic men and found success rates from a brief contact paralleling that of long-term treatment. Skinner and Holt (1983) built upon this success, and called

for more infusion of early intervention with alcoholics into medical settings. Particularly, Skinner and Holt highlight the Emergency Department as "prime location" for conducting screenings for alcohol abuse due to the prevalence of alcohol-related traumatic injuries (p. 788).

Others recognized medical settings as unique settings for intervening with this patient population. Kubes (1990) describes a unique program in which nurses perform interventions with hospital inpatients in Lincoln, Nebraska. After consulting with the attending physician, the nurse intervention includes an interview with patients, screening for alcohol and drug abuse, education for patients, and referrals to treatment when indicated (Kubes, 1990). After implementation of this program, the referrals went from approximately 30 per year to over 500 per year. The intervention program also worked heavily with family members, providing them with education and referrals to supportive services (i.e., Al-Anon, ACOA groups). Kubes provided a report highlighting the success of this nurse intervention program, and a call to action to others' to fill the gap with this critical need.

Due to an identified need to identify appropriate medical inpatients at risk of alcohol related problems, Graham (1991) developed an assessment instrument and tested this in a community hospital setting. This assessment, titled the *Lifestyle Risk Assessment Instrument* was constructed of the Trauma History (Skinner,Holt, Schuller, Roy, & Israel, 1984), the CAGE questions (Ewing, 1984), the Michigan Alcohol Screening Test (MAST) (Selzer, 1971), along with questions about cigarette use, exercise, stress, and nutritional diet. Graham found the assessment to be non-threatening, with 100 of the first 102 patients approached agreeing to participate. Overall, the assessment was associated

with an increased identification of alcohol-related problems in the hospital setting, along with an increased likelihood that treatment planning would occur via consultation with the addiction medicine service.

As with the early Chafetz et al. (1962, 1964) studies, the beginnings of brief counseling intervention research involved the facilitation of referrals to specialist services for alcoholics (Bien, Miller, & Tonigan, 1993). Brief interventions evolved from discussions targeting referrals to specialist treatment to discussions about one's drinking behavior (Bien et al., 1993). Kristenson et al. conducted the first of this kind in 1983 (as cited in Bien et al., 1993). These authors conducted a randomized controlled trial to study the difference between two groups: the intervention group received a counseling session from the physician and follow-up appointments with both nurses and physicians through out a yearlong period. The control group received notice of their concerning test results via the postal office, with medical follow-up only bi-yearly. Kristenson et al. (1983) found that the intervention group had less sick days, hospitalizations, and half of the mortality rate of the control group at six-year follow-up.

Wilk, Jensen, and Havighurst (1997) conducted the first meta-analysis of brief interventions among heavy alcohol drinkers, marking this heavy use by binge activity but not dependence. The meta-analysis included studies conducted in both health care settings (e.g., primary care, emergency departments) and substance abuse treatment centers. After identifying 12 studies that fit inclusion criteria, the authors found that heavy drinkers who received an intervention were more than two times as likely to moderate their drinking, as compared with those individuals who did not receive the intervention. Significant to this review, Wilk et al. stated that the generalizability of the

findings are limited to the risky-drinking population, as many of the included studies purposely excluded dependent individuals from analysis. The authors further state that individuals who exhibit alcohol dependence are not appropriate for brief interventions, because if a brief intervention were their sole treatment they would be at an increased risk for withdrawal.

The results of the early studies of brief intervention showed significant effects when compared with traditional treatment of alcohol disorders (Bien et al., 1993). A variety of interventions were studied, from brief five-minute advice (WHO, 1996) to 20-minute intervention sessions including monthly check-ups (Kristenson et al., 1983). Although differing in length and content, the early interventions were highly significant in that they showed similar results to traditional treatment for alcohol use disorders, along with finding significant differences in reduction in alcohol consumption, in comparison to control groups who were not receiving brief interventions.

Screening and Brief Intervention in Non-Trauma Healthcare Settings

The following section will outline the key ASBI studies that have been conducted in healthcare settings, however, these will be limited to those that are not trauma center settings. Two of the most significant healthcare settings to conduct empirical investigations into ASBI efficacy are primary care facilities and emergency departments. Each of the landmark studies within these settings will be examined.

Primary care. In the most extensive cross-cultural evaluation of brief interventions, enrolling 1559 patients worldwide, the World Health Organization Brief Intervention Study Group (1996) found that brief interventions lasting from five to twenty minutes, showed a reduction in an individual's average consumption of alcohol.

These interventions focused on exploring alcohol use patterns, health consequences, and benefits of reducing alcohol consumption, and were conducted in primary care settings. What made this study remarkable is that the study participants were recruited from eight countries around the world (i.e., United States, Australia, Kenya, Mexico, Norway, Russia, Zimbabwe, and Wales) and therefore the results are generalizable across cultures, socioeconomic groups, and settings used for the intervention. The study further found that more heavy drinkers responded favorably to the brief interventions, particularly the male participants. The large-scale success of this study was influential to the implementation of alcohol screening and brief intervention procedures worldwide.

Bertholet, Daeppen, Wietlisbach, Fleming, and Burnand (2005) conducted an extensive meta-analysis of ASBI studies in primary care settings. After identification of 19 randomized studies, the authors had a total of 5,639 participants, each of whom presented to a primary care physician. The main outcome examined through the meta-analysis was reduction in alcohol consumption, which was found to decrease by approximately four standard drinks per week for the intervention groups. The results of the meta-analysis suggested ASBI to be effective for both men and women at both six and twelve month follow-ups.

Guth et al. (2008) conducted a retrospective analysis of 326 participants enrolled in a randomized clinical trial with the purpose of examining the impact a diagnosis of alcohol dependency has on efficacy rates of ASBI for primary care patients. Dependency status was assessed via the Composite International Diagnostic Interview-Substance Abuse Module (CIDI-SAM; Cottler, 2000). The baseline results suggested that although the dependent patients report a higher quantity of alcohol consumption per occasion (5.8

standard drinks compared to 4.4 standard drinks for the nondependent sample, $p < .01$), the frequency of consumption did not differ between the groups (5.7 and 5.8 days per week, p=.54). After a six-month follow-up period, the authors found significant support for the efficacy of ASBI for dependent patients, with that group reporting a two times greater decrease in the amount of drinks consumed per week than the nondependent group. The dependent group reduced their alcohol consumption by 4.97 standard drinks per week, compared with a 2.55 standard drink reduction for the nondependent group. This group also significantly reduced the frequency of consumption in direct comparison to the nondependent group; at follow-up the dependent group reported consuming alcohol 4.72 times per week, whereas the nondependent group reported consumption of 5.27 times per week, (p=.02). Guth et al. (2008) provide empirical support for the current retrospective analysis by stating, "the results contained in this report suggest that patients who are alcohol dependent show a significant reduction in their drinking subsequent to a BI and that the magnitude of the reduction is analogous with that of nondependent patients" (p.249).

Overall there has been significant support to continue implementation of ASBI within primary care settings. Results are encouraging not only for the reduction of alcohol consumption for primary care patients (Bertholet et al., 2005) but also for large scale implementation, as seen with the success of the WHO project in eight nations (World Health Organization Brief Intervention Study Group, 1996). Guth et al. (2008) provide not only support for the implementation of ASBI for primary care patients, but raise awareness and provide empirical support for intervening with the more severe risk

drinkers. The success of ASBI within primary care has laid the foundation for further empirical investigations into other key healthcare settings.

Emergency departments. Prevalence rates estimate that between 24 and 31% of patients cared for in emergency department (ED) settings screen positive for alcohol-related problems (D'Onofrio & Degutis, 2004/2005). The prevalence increases to upwards of 50% (ACS, 2006; D'Onofrio & Degutis, 2004/2005) among emergency department trauma patients. There is a clear need for the inclusion of ASBI services within emergency departments, however in 2007 the Academic ED SBIRT Research Collaborative noted there had yet to be widespread empirical investigation into ASBI implementation in EDs. Over the course of the past five years, research has increased, and there has been mixed findings concerning the implementation of ASBI services in EDs. A review of this research follows.

The Academic ED SBIRT Research Collaborative (2007) reported the findings of a substantial investigation concerning implementation of ASBI provided by ED personnel. The study recruited 1,132 participants from 14 sites nationwide, who were placed in either the intervention group, or the control group. There was no random assignment, and the authors stated this was due to the belief that once the providers learned the techniques for the intervention, known as the Brief Negotiated Interview (D'Onofrio et al., 2005), they would have difficulty not using the techniques, which would contaminate the control group. At three months follow-up, the authors found significant differences between the intervention and control groups. The intervention group on average drank 3.25 fewer drinks per week, and 37.5% of the intervention group were able to reduce consumption to not exceed the NIAAA's guidelines, compared with only 18.6% of the

control group. The follow-up period was continued, and further results were presented in 2010 by the research collaborative.

The Academic ED SBIRT Research Collaborative (2010) were able to follow up with 569 and 434 participants at six and twelve-month periods, respectively. The researchers discovered that while the results were significant at the three-month follow-up point between those participants whom received the brief intervention and those in the control, there was no longer a difference at either of the later follow-up points. The authors cite retention as a main limitation, with 38.3% of the total enrolled participants completing follow-up at the twelve-month point. The authors suggest that to maintain the impact seen at the three-month follow-up, multi-contact sessions might be integrated into the care plan, although because of the nature of this population being highly transient, the feasibility of this is unknown.

Daeppen et al. (2007) conducted an investigation of brief interventions within an ED in Switzerland. The researchers enrolled 987 participants who were randomized into three groups, one intervention and two controls. The intervention group received the initial screening consisting of a variety of health-related questions (e.g., presence of depression, tobacco use, use of a primary care physician, and alcohol and drug use), along with a more involved assessment (i.e., demographic questionnaire, the AUDIT (Babor et al., 2001), a seven-day time-line follow-back procedure measuring alcohol consumption, and the SF-12 [Ware, Kosinski, and Keller, 1996] to measure health-related quality of life) and a brief intervention following Zweben, Rose, Stout and Zywiak's (2005) Brief Alcohol Intervention (BAI). The study utilized two control groups. Both were screened with the initial screen, and one control group was limited to only that; the

other control group was then also assessed the same way as the intervention group. According to Daeppen et al., two controls were used to minimize the potential assessment effects.

The researchers were able to follow-up with 770 of the participants at the twelve-month period, representing 78.0% of those initially enrolled, a fairly high retention rate (Daeppen et al., 2007). Overall, the researchers found that approximately one-third of participants were able to reduce drinking to low-risk levels, however this was consistent across the groups. The authors mention several assessment strategies and instruments, however it is unclear what cut-offs they utilize for low-risk or risky levels. The researchers began to break down the analysis further into separate subgroups to see if there was a difference based on gender, age, or AUDIT scores. Individually, there was no difference, however the authors reported that across all three treatment groups (intervention and both controls), being female and having an AUDIT (Babor et al., 2001) score greater than 12 predicted change to low-risk levels at 12-months.

D'Onofrio et al. (2008) examined the effects of emergency practitioner performed alcohol brief interventions for hazardous and harmful drinkers who present to EDs following an injury. The primary outcome of the study was reduction in alcohol consumption as measured by number of drinks reported per week, and the number of reported binge episodes per month. D'Onofrio et al. utilized the NIAAA guidelines to establish hazardous drinkers: >14 drinks per week and > 4 drinks per occasion for men; > 7 drinks per week and > 3 drinks per occasion for women and persons over the age of 65 (NIAAA, 2005). This randomized, controlled clinical trial enrolled 494 participants, of whom 92% were followed up at twelve months. Participants were randomized into one

of two groups: the intervention group, following the BNI (D'Onofrio et al., 2005), or a scripted discharge instruction (DI) group, consisting of discharge instructions, which was titled *Project ED Health*.

Overall findings from the D'Onofrio et al. (2008) study reported no difference between the BNI and DI group; each group reported approximately one-third decrease in participants' alcohol consumption, similar to the Daeppen et al. (2007) study. The BNI group participants reported an average decrease in 3.6 drinks per week at 12-month follow-up, with the DI group reporting a similar 2.5 drinks per week decrease. The BNI group participants further reported an average decrease of 2.0 binge episodes per month, which was not statistically significantly different from the DI group report of a 1.5 decrease in binge episodes per month. Of significance to this particular review, participants who were considered to be potentially alcohol dependent by AUDIT scores of 20 or more (Babor et al., 2001) were excluded from enrollment.

Hungerford et al. (2003) conducted a study to determine the feasibility for implementing alcohol screening and interventions for young (ages 18-39) adults in an ED setting. The authors state their reason for limiting enrollment to the specific age range was because that population has more prevalence of alcohol problems than the older population as reported by Grant et al. (1994) (as cited in Hungerford et al., 2003). Eligibility for the study was based on age and whether or not the individual consumed alcohol within the previous year; if they had consumed alcohol, they were considered eligible. As this was a feasibility study and not a randomized trial, all eligible participants who agreed to enroll in the study were offered the same protocol. The 2,067 patients who were eligible and consented to the study were then further assessed using

the AUDIT instrument (Babor et al., 2001). A cut-off score of six was chosen for the purposes of this study, which narrowed the study sample size to 894, of whom 856 received the brief intervention. The authors state that they began contacting patients for follow-up three months after their discharge, and successfully completed this telephone interview with 519 (61%) of enrolled patients. The findings suggest the implementation of the services within the emergency department had a significant impact. Among those participants enrolled and for whom follow-up was achieved, AUDIT scores decreased for 82%, with a mean decrease of 3.2 points. The authors further highlighted that the dependence-cluster questions on the AUDIT (i.e., questions number 4, 5, and 6) decreased for 63% of their participants. The authors did comment on their retention rate of 61% and noted that analysis revealed those lost to follow-up had higher baseline AUDIT scores (12.6 compared to 11.7 for those that completed follow-up). This difference just met statistical significance with a p value of .05. Hungerford et al. interpreted the results of this study to support the integration of ASBI services into ED settings for the younger population.

In general, the ED setting sees a large number of patients admitted each year for injury, many of which are alcohol related (D'Onofrio et al., 2004/2005). When considering the results of other research focusing on implementing ASBI procedures into key healthcare settings, it was acknowledged that research to test the efficacy of the procedures in the ED setting was needed. These implementation efforts have been shown mixed results.

In their nonrandomized study, Hungerford et al. (2003) found success with implementing ASBI for 18-39 year olds in the ED setting. In a similar way, other

researchers have found that implementing ASBI does reduce alcohol consumption at follow-up, however the results dissipate as the length of follow-up increases (Academic ED SBIRT Collaborative, 2010). This is similar to other research that has found the overall implementation reduces alcohol consumption (Bertholet et al., 2005), but it is unclear what change can fully be attributed to, with both control and intervention groups decreasing consumption at follow-up, with no significance between the two (Daeppen et al., 2007; D'Onofrio et al., 2008). The unclear results of these studies led Bernstein and Bernstein (2008) to hypothesize several factors influencing the research process of ED ASBI. The authors suggest future research focus on three key areas: 1.) enhancement of research efforts to control confounding variables, 2.) examination of intervention elements (i.e., content, provider, and amount of contact), and 3.) analysis of unique participant characteristics to identify the best target population for efforts (Bernstein & Bernstein, 2008). Although these suggestions were made particularly as a call to action for ASBI researchers in the ED setting, this author believes they are appropriate for use across all settings ASBI in which has been implemented.

Screening and Brief Intervention in Trauma Settings

The success of the implementation of screening and brief intervention procedures into medical settings such as primary care and emergency departments, combined with the high prevalence of alcohol-related injury and post-discharge related complications, led to the logical inclusion of ASBI into trauma centers. Nationwide there are over 100 accredited Level I trauma centers (ACS, 2012).

According to the ACS (2006) trauma care in the US is a large network of numerous different systems combining efforts to ensure the best and most effective

medical care is available to patients. The term Level I is most often utilized within this current review, however there are numerous other trauma center designations. The trauma care system is comprised of level I, level II, level III, and also relies on services provided at regional and local hospitals (ACS, 2006).

Level I trauma centers meet stringent accreditation standards in order to provide the best care possible to the most severely injured patients who are at immediate risk for losing a limb or life if medical intervention does not occur immediately after injury (ACS, 2006). Example injuries that present at these centers include motor vehicle collisions, gunshot wounds, stab wounds, pedestrians struck by vehicles, and falls. There are many differences distinguishing Level I centers from Level II centers, however a key difference between a Level I trauma center and a Level II trauma center is that a Level I must have in-house specialist trauma surgeons (as opposed to trauma surgeons on call), and conduct internal research, where a Level II trauma center must only have specialists on call to attend to traumatic injuries (ACS, 2006). Also, a Level I must provide clinical services to over 1200 patients annually (ACS, 2006).

Over the past 30 years, scientific advancements have assisted the national trauma system with their efforts to significantly reduce mortality rates (Gentilello, 2005). Development of trauma registries to analyze outcomes and facilitate research, and working on quality improvement programs helped decrease the preventable death rate in trauma centers from 40% to approximately 4% currently (Gentilello, 2005). Gentilello (2005) states that it is not likely new and better treatments will be discovered in coming years, and therefore, the next wave of reduction in mortality must come from prevention

efforts, of which alcohol screening and brief intervention are a large part (Gentilello, 2005).

Gentilello, Donovan, Dunn, and Rivara (1995) provided the first call to action for trauma centers by the medical community. In building upon the National Institute of Alcohol Abuse and Alcoholism's concern about prevalence of alcohol-related trauma incidents (as cited in Gentilello et al.), the authors provide justification for the inclusion of screening and brief intervention procedures into trauma centers. Gentilello et al. also provide ideas for including ASBI into routine practice (i.e., gaining admission blood alcohol levels, suggesting screening tools, and identifying personnel who might be appropriate for conducting the procedures). The authors further highlight data from a pilot study in which 19 trauma patients were provided a brief intervention, and 89% of those patients (n=17) completed counseling after a referral from the intervention staff. Gentilello et al. provided the groundwork in this seminal piece of literature for attention to this issue within trauma centers nationwide.

Soderstrom and Cowley (1987) performed a nationwide survey of trauma centers to identify the prevalence of screening for alcohol abuse. The results indicated that only about 29% of centers nationwide performed any screening to identify patients at risk for alcohol-related harm in the 1980s. A key reason for lack of attention given to this population was an attitude held by trauma center staff that such a discussion would be worthless (Gentilello et al., 1995). These results showed the discrimination faced by individuals with alcohol use disorders that Spicer (1993) emphasized in his work. By 2003, the statistics changed drastically, as Schermer et al. highlighted in a survey of trauma surgeons. These authors found that 83% of trauma surgeons believed that trauma

centers are appropriate places to provide discussions focusing on a patient's alcohol use and related harm. Although the attitudes appeared to be more supportive, compliance with screening was much less. The majority of centers report using admission blood alcohol levels to identify risky drinkers where only about 25% reported performing an additional screen. Although the results of the survey were promising with regards to a change in attitudes, it remained clear that there was much need to promote the growth of conducting screens and performing brief interventions.

In 2006, the American College of Surgeons mandated the screening and brief intervention mechanisms be implemented nationwide in order for trauma centers to uphold Level I and Level II accreditation (Gentilello, 2007). According to the ACS (2006):

> Alcohol is such a significant associated factor and contributor to injury that it is vital that trauma centers have a mechanism to identify patients who are problem drinkers. Such mechanism is essential in Level I and II trauma centers. In addition, Level I centers must have the capability to provide an intervention for patients identified as problem drinkers. (p. 116).

To assess the implementation efforts of centers nationwide, Terrell et al. (2008) conducted a survey, also nationally, to gain understanding of screening and brief intervention procedures. Findings suggested that approximately 70% of centers utilized blood alcohol levels upon admission as the primary screen, similar to the Schermer et al. (2003) findings. About 40% of centers reported using questionnaires (e.g., CAGE, AUDIT, and MAST) to identify at-risk patients. The results provided poor statistics regarding the use of empirically-based intervention techniques, with only 40% claiming use of such interventions. Although the ACS requirements are clear about the need to implement SBI procedures, the mandate is quite vague concerning the details of

implementation. As such, there is wide variety in not only what screening instruments and intervention techniques are being used, but also who is providing these services. Again, although the results were promising in regards to the numbers of centers embracing the procedures, the results highlighted a need for growth in implementation of empirically sound ASBI practices.

Empirical Studies in Trauma Centers

Gentilello et al. (1995) provided a rationale for implementation of screening and brief intervention procedures into trauma centers. Following the call, and the results of the pilot study, there was a need for more empirical validation of the benefits for the services with this distinct population (i.e., trauma patients). Although Gentilello et al. believed there was a window of opportunity, large scale, methodologically sound, empirical evidence was needed to support this claim.

The results of the first randomized control trial of alcohol interventions in a Level I trauma center were reported by Gentilello, et al. (1999). The purpose of the study was to identify whether providing a brief intervention to trauma patients would limit recurrent traumatic injuries and subsequent visits to the trauma center. The total sample size was 762, with the intervention group consisting of 366 participants, and the control group having 396 participants. The researchers reported a 47% reduction in new injuries that would have involved a subsequent visit to the trauma center in the intervention group, and a 48% reduction in inpatient hospital admissions for the intervention group, both results significantly different from the control group. The results also suggested a reduction in alcohol consumption, which occurred for both the intervention and the control groups. The reported reduction was significantly greater for the intervention

group (21.8 standard drink per week reduction) in comparison to the control group (6.7 standard drink per week reduction). Although both groups reduced their alcohol consumption level, the control group's reduction diminished over time, while the intervention group maintained reduction in alcohol consumption at follow-up. The results of the study by Gentilello and his colleagues not only provided significant hope for intervening with the trauma population but also a strong empirical foundation from which other research could be conducted.

The findings of significant outcomes from the Gentilello et al. (1999) study spurred interest from other researchers to identify other outcomes of interest. Schermer et al. (2006) conducted an investigation to understand the impact trauma center brief interventions have on driving under the influence arrests. Among 126 patients enrolled in either an intervention or control group, there were significant differences in subsequent driving under the influence citations between the groups. Within the following three years after receiving a brief intervention, the control group reported approximately 21.9% citations for subsequent driving under the influence (DUI) arrests, where the intervention group reported 11.3%. The brief intervention was further found to be the strongest protective variable, after multivariate analysis, for helping participants prevent further DUI citation. The results of the Schermer et al. study are promising in that the success of the trauma center brief interventions did not only positively impact the individual receiving the intervention, but also led to benefits for their communities.

Patient Characteristics Impacting Screening and Brief Intervention Efficacy

The review of existing literature of screening and brief intervention efficacy identified that the overwhelming majority of the literature base focuses on clinical trials

to examine if an intervention, compared with a control group, influences an individual's drinking behavior. The participants have not been limited to a particular demographic, but mostly grouped by setting (i.e., primary care, emergency department, or trauma center settings). Few research studies have examined the influence of particular patient characteristics (Guth et al., 2008), except for observational results in the clinical trials. Direct attention to patient characteristics through an empirical study will provide information concerning efficacy of such approaches for different individuals. The results may highlight a particular target population who will gain greater benefit from the intervention, or a population who do not benefit substantially from ASBI, which can inform policy and practical decisions for providers. This type of inquiry will also provide grounds for further empirical validation of the findings. The following section will highlight the observational results of patient characteristics found throughout the screening and brief intervention literature.

Risky drinkers. The majority of empirical research conducted on screening and brief intervention has targeted those with risky drinking behaviors. Overall, more severe drinkers have been excluded from analysis. General consensus agrees that the risky drinkers are those who can benefit from screening and brief intervention procedures. The NIAAA (2010) defines at-risk drinking as more than four drinks on any day or 14 per week for males, and more than three drinks on any day or seven per week for females. Individuals that exceed these risky limits are at an increased risk for developing alcohol abuse and/or dependence, and have elevated risk of experiencing other health-related complications (e.g., injuries, sexually transmitted diseases, liver diseases, heart diseases, depression, and stroke) (NIAAA, 2010). Currently, strong empirical support shows that

providing brief interventions reduces subsequent alcohol-related harms (Bien et al., 1993; Gentilello et al., 1999; Goodall et al., 2007; SAMHSA, 2012; Schermer et al., 2006; Soderstrom et al., 2007; Wilk et al., 1997). Outcomes include: reduction of alcohol consumption, recurrent injury, recurrent inpatient hospitalizations (Gentilello et al., 1999), and DUI citations (Schermer et al., 2006); decrease in criminal justice arrests, depression, anxiety, suicide attempts; and an increase in abstinence from alcohol and other drugs (SAMHSA, 2012). The efficacy of screening and brief interventions for risky drinkers has been well established in the literature, as highlighted in other sections throughout this review.

Severe-risk drinkers. There has been a general consensus that traditional alcohol screening and brief interventions will not be appropriate for the more severe drinkers (Sommers et al., 2006), also referred to as the dependent population when appropriately assessed. The attitudes presented by Schermer et al. (2003) about the lack of belief in the success of discussing alcohol use with patients are still alive and flourishing, however the targets are the more severe drinkers, and it is unclear from whom these attitudes come, but do appear to be from those not involved in direct service delivery. Although there have been large claims about the lack of efficacy for the more severe population, limited empirical evidence has examined this different sub-population. The empirical evidence to offer support for inclusion or exclusion of severe-risk drinkers is anything but consistent. Findings appear which support the inclusion of the population (Guth et al., 2008; Soderstrom et al., 2007) and findings support the same population's exclusion (Saitz, 2010). However, when thoroughly critiquing the literature, it does appear as though the results to exclude the population of severe risk drinkers are, at times,

emphasized to the point of inflation. It is clear that little is known about hospital patients with severe alcohol-related problems and there is a need to empirically validate general consensus claims concerning this highly stigmatized population.

In the landmark study of screening and brief intervention with trauma patients, Gentilello et al. (1999) found large support for providing SBI services with the trauma population. Although the results were significant for reducing subsequent injury and hospital admission, along with alcohol intake, the research also revealed one negative predictor of intervention response- whether or not an individual had prior treatment for an alcohol use disorder, thus indicating that those who had prior alcohol treatment did not respond to the intervention. The results also highlighted that those participants with high screening scores (9-13 on the Short Michigan Alcohol Screening Test [SMAST]) responded poorly to the intervention as measured by no decrease in the amount of alcoholic drinks consumed per week at follow-up. This is in contrast to those with intermediate (3-8) scores on the SMAST who received the intervention and who they reportedly decreased their consumption by 21.6 standard drinks per week. The authors did find that unemployed individuals and those without external support fared better after the intervention than those who did have these supports, as noted in a significantly drastic reduction in standard alcohol drinks consumed per week from baseline to the 12-month follow-up. This seems counterintuitive to their other results about lack of efficacy for the more severe participants. If anything, the results add to (not reduce) the complexity of identifying who would be appropriate for alcohol interventions.

There were promising results for the severe drinking population in Schermer et al.'s (2006) investigation of brief interventions on reducing subsequent driving under the

influence citations. Schermer et al. noted that they did not exclude the dependent patients, or those with previous DUI citations from enrollment, or from analysis, as other studies have done. The authors note that even with the inclusion of this subpopulation, their findings were significant and strong. In fact, the authors stated, "we conclude that severe problem drinkers should not be excluded from BI efforts although they may ultimately need more extensive treatment" (p. 32).

Few other researchers examined SBI that included the individuals with severe drinking screening results. One study by Soderstrom et al. (2007) conducted a clinical trial of two types of interventions (motivational interview versus brief advice). Although the authors note they particularly ruled out the patients with severe drinking problems, they do reference a difference in consumption level for all drinkers in the study. Findings suggested that those patients who drank more on average responded to both of the interventions, and also had more motivation to change. These results are similar to the findings of the Goodall et al. (2007) study that reported findings from a brief intervention for patients following facial trauma. Findings indicated that the patients with the highest AUDIT scores had the most degree of change following the brief intervention (Goodall et al., 2007). It is possible that because the scores were greater these patients had more opportunity to change, which influenced the degree of change. However, it may also be viewed as a challenge instead of an opportunity, indicating those with higher scores had to overcome greater obstacles to make significant changes. From these two studies, one could argue that these results are encouraging to support attending to this more severe population, although more empirical evidence is needed to confirm this.

Saitz et al. (2007) conducted an investigation of ASBI efficacy for hospitalized medical inpatients. Key outcomes measured were the receipt of alcohol treatment for those identified as alcohol dependent at three-month follow-up, and overall reduction in alcohol consumption as measured by the number of drinks consumed per day at 12-month follow-up. The authors enrolled a total sample size of 341 patients and did not find support for the brief intervention for either increasing treatment acceptance or reducing alcohol consumption at follow-up. Although the support for the intervention was not found specifically, the authors did find an overall reduction in heavy drinking episodes from all participants, and an increase in the reported number of alcohol abstinent days also from the entire sample. These results are encouraging and further support the need for more research aimed at delineating ASBI procedures and treatment effect.

Saitz (2010) conducted a systematic review with the purpose of examining efficacy rates of ASBI for patients whom could be diagnosed as alcohol dependent within the primary care setting. The author located 16 studies that met his inclusion criteria, however the final analysis focused on two key articles, as 14 studies excluded patients with either very heavy alcohol use or dependence. Saitz (2010) concluded that from the results of these two studies in primary care (Burge et al., 1997; Chang, Behr, Goetz, Hiley, & Bigby, 1997) there is "no evidence to support alcohol screening and BI efficacy among primary care patients with very heavy drinking or dependence" (p. 4). Although this statement is valid considering the overall results produced via the two cited studies, the definitive strength of the statement made by Saitz (2010) appears to be unwarranted considering key aspects of both the Burge et al. (1997) and the Chang et al. (1997) studies.

The Chang et al. (1997) study was conducted on a small sample size (N=24), which was recognized by the authors as a limitation of the study, which would prevent further generalizability of the results. Burge et al. (1997) conducted a specific analysis of ASBI efficacy among primary care patients, focusing solely on those identified as Mexican-American. The authors reported that the entire group of participants reported a reduction in alcohol consumption, and addiction severity as measured by the Addiction Severity Index (ASI) (McLellan, Luborsky, O'Brien, & Woody, 1980) at 18-month follow-up. Although this finding of no difference between intervention and control groups supports Saitz's (2010) claim, again, the issue of generalizability comes into question. As the sample was limited to one ethnic subgroup, the results of the study cannot be generalized to the larger primary care population. The question of whether or not to include or exclude the more severe drinkers from ASBI efficacy studies cannot be answered solely on the base of the Burge et al. and Chang et al. studies due to the issues with generalizability. These two studies do add to the confusion surrounding this particular subgroup, and provide support for continuing to examine ASBI efficacy among particular populations.

Goodall et al. (2007) conducted an investigation of brief interventions administered by nurses following traumatic facial injury. The results of that study are covered elsewhere within this review, however the authors did find significant findings in relation to the more severe risk drinkers. These authors found that as the AUDIT score increases, so does the benefit from intervention as measured by a decrease in drinking days, an increase in abstinent days, a decrease in standard drinks per day, and a decrease in heavy drinking days at 12-month follow-up via self-report of the participants.

Recently, Cobain et al. (2011) conducted a study to evaluate the efficacy of brief interventions within acute hospital settings for patients identified as being dependent. The purpose of this was to identify whether or not the general consensus within the literature that BIs are not effective for the dependent population is rooted in empirical evidence (Cobain et al., 2011). In order to examine this the researchers utilized two hospitals, one in which BI was integrated as the standard of care (the intervention group), and another in whom it was not (the control group). The authors reported using the AUDIT as an initial screen, and those patients who scored greater than 15 were then further assessed via the Severity of Alcohol Dependence Questionnaire (SADQ). Two hundred participants were enrolled, with 48 completing follow-up at six-months in the intervention groups, compared to 50 in the control group. Overall, there was a reduction in dependence between the two groups, however this was drastically different between the intervention (77%) and control (20%) group. Of those who remained dependent (as measured by the ASDQ) in the intervention group, 20.8% reduced this from the severe category to mild/moderate. None of the individuals in the control group reduced the category of their dependence, while one reportedly increased his or her dependence category. Not only was there reported change on the ASDQ measure, but also the AUDIT. The baseline AUDIT scores for the intervention and control groups were 33.68 and 29.74, respectively. The authors noted that this was significantly different with the intervention group having higher scores, and controlled for this in further analysis. At six-month follow-up the AUDIT scores were reduced for both groups, with a significant reduction for the intervention group (13.5) compared with the control group (24.90). An important note is that this study was conducted in England, and therefore provides

encouraging evidence to consider the inclusion of this more severe population within studies located in the US.

From the above review concerning severe-risk drinkers, the empirical evidence concerning inclusion of this population is not consistent. There are reports that do not support the inclusion of this population (i.e., Burge et al., 1997; Change et al., 1997; Saitz et al., 2007; Saitz, 2010) while there is also significant evidence to support ASBI services with this more severe population (i.e., Cobain et al., 2011; Goodall et al., 2007; Guth et al., 2008). What appears to be consistent within this literature base is the need to attend to this population. The prevalence of severe risk is quite high across different specialties in the medical community, and there has been insufficient attendance up to this point.

Age. Alcohol use disorders do vary in prevalence according to age group. According to the NIAAA (2008), the prevalence does decrease as age increases, representing an inverse relationship. The prevalence rates of being diagnosed with an alcohol use disorder (i.e., abuse or dependence) by age group provided by the NIAAA (2008) are as follows: 18.4% of 18-24 year olds, 10.5% of 25-44 year olds, 5.4% of 45-64 year olds, and 1.5% of for those aged 65 and older. It is unknown whether or not age is a significant variable within alcohol screening and brief intervention research.

Age has been examined within the SBI literature in as much as identifying the efficacy of SBI practices for particular age groups. Significant results have been found for the following subsections: adolescents (Monti et al., 1999; Spirito et al., 2004), college students (Kazemi, Sun, Nies, Dmochowski, & Walford, 2011), 18-24 year olds (Monti et al., 2007), and 18-39 years olds (Hungerford et al., 2003). Other investigations have made observational comments regarding age. For instance, in examining SBI

practices for the adolescent population Ehrlich et al. (2010) found the only significant predictor that an adolescent would have a positive AUDIT score was being greater than or equal to 14 years old. The influence of age upon the SBI process has not been established, and this current analysis hopes to provide evidence to support future inclusion/exclusion of this important variable.

Gender. In the first empirical study of screening and brief intervention efficacy for the trauma patient population, Gentilello et al. (1999) found significant differences in reduction in injury recurrence, recurrent inpatient hospital admission, and reduction in standard alcohol consumption. However these results were not detected among female trauma patients, which the authors attributed to a small sample size of female participants in the study (n=197).

The results of Gentilello et al.'s (1999) original study of SBI in trauma settings and the implications for lack of efficacy for women spurred further investigation into understanding the significance of alcohol-related problems among women trauma patients. Gentilello et al. (2000) presented these results in a comparison of genders. Findings suggested that both men and women have similar alcohol-related problem severity, however women were more likely to report drinking due to psychological distress, depression symptoms, and recent domestic violence exposure. Women in the study were also found to have much more severe liver damage compared with their male counterparts. Compared with the lack of efficacy in intervention for women found by the Gentilello et al. (1999) study, this study emphasized the importance of paying due attention to specific subpopulations in the overarching trauma population.

Sanchez-Craig, Leigh, Spivak, and Lei (1989) studied the efficacy of a brief approach for reducing heavy drinking. The authors enrolled 52 men and 38 women for this study, which contained three groups: one pamphlet group describing alcohol consumption guidelines, one manual group in which the participants met with a therapist who instructed them how to utilize this manual to achieve abstinence or moderate drinking, along with a counselor group which included six sessions of instruction and discussion regarding the manual. This manual was developed by first author, Sanchez-Craig (1984) and was rooted in cognitive theory. During the analysis, the authors found no significant difference between the three treatment groups for reduction of heavy drinking days. Sanchez-Craig et al. did find that women were more successful than men at reducing their alcohol consumption (75% versus 35%) and they were also more successful with controlled drinking than their male counterparts. One difference was found between genders at the three-month follow-up: males were more successful in the counselor group, where females were more successful in the other two groups. This difference was not shown at one-year follow-up, but Sanchez-Craig (1990) was intrigued by the notion that the women did significantly better with reducing their alcohol consumption when they had less contact with the counselors. Although this was not a brief intervention trial, nor was this conducted in a healthcare setting (it was in an addiction research clinic), the results in relation to gender pertain to this current proposal.

Chang, Behr, Goetz, Hiley, and Bigby (1997) conducted a small analysis of women and brief intervention in a primary care setting. The authors enrolled 24 women into the randomized trial, in which participants were randomized to either a brief intervention group, administered by a psychiatrist, or a treatment referral group. No

difference was found between the intervention group and the referral group at 90-day follow-up. The authors state that this is in contrast to other brief intervention trials in primary care (i.e., Heather, 1995). Within the referral group, ten individuals were deemed appropriate for the referral after the initial assessment. Chang et al. note that six of the women refused a referral, and that although four of them accepted the referral initially, none of them presented at the referring agency. The authors state severity of alcohol abuse and dependence within the 24 women as a reason for failing to produce successful outcomes in reduction at follow-up. Although this study did not highlight intervention efficacy with women, it did add to the need to identify appropriate treatment for females.

Houry, Hankin, Daugherty, Smith, and Kaslow (2011) presented the findings of a randomized trial for African-American women in an emergency department. The intervention was described as educational, and not only included alcohol abuse, but also intimate-partner violence, nicotine and drug dependence. The randomization occurred after a computer-based assessment, in which after a woman screened positive to any of the four scales, she was placed in either the information about community resources control group, or the targeted educational handouts group, based on results of the computerized assessment. Houry et al. recruited 326 women, although only 71 were follow-up with. Regardless of the small follow-up rate, the authors did report significant differences between the intervention and control groups. The women in the intervention group were more likely (37% compared to 9%) to have contacted local resources, and also to have taken action to reduce risk for whichever health behavior was of concern at assessment (97% compared to 79% for the control group). Results of this study are

encouraging not only for female participants, but also for African-American women, whom are at an increased risk of being heavy drinkers compared to White women (Blazer & Wu, 2009; Wilsnack & Wilsnack, 1991).

Another inquiry involved hospitalized medial inpatients on a general medicine service, in which Saitz et al. (2009) found gender effects through analysis, although the initial study was solely looking at ASBI efficacy for this population. In a retrospective analysis, the researchers were interested with examining how key factors (i.e., demographics, alcohol dependence, health/comorbidity, and readiness to change) influence patients' acceptance of a referral to treatment, reduction in alcohol consumption, alcohol problems, readiness to change, health-related quality of life, and health care use. At 12-months 287 of the enrolled 341 participants completed follow-up. The findings suggested that overall women benefited the most from brief interventions, as shown by an increased acceptance of referral to treatment. The acceptance of the referral to treatment was significant for the women who were enrolled in the brief intervention group only. Saitz et al. did not find that the intervention influenced individuals' reduction in alcohol consumption, as both the intervention and control groups reported decreases at follow-up. This finding is similar to other results conducted in the primary care setting (Daeppen et al., 2007; D'Onofrio et al., 2008).

Burge et al. (1997) conducted an investigation into the efficacy of ASBI for Mexican-Americans. The study results are highlighted below, however, important gender differences shall be noted here. The authors enrolled 43 women in this study that was 25% of their final sample. At baseline the female participants, as noted by Burge et al., were significantly less likely than the male participants to have any legal troubles

associated with alcohol consumption, however reported significantly more family conflict and psychiatric symptoms, as measured by the Addiction Severity Index (McClellan, Luborsky, Cacciola, Griffith & O'Brien, 1988). The authors found that women were also much more consistent with attendance at both the follow-up interviews, 93% compared with their male counterparts at 72%, and were more likely to attend the psychoeducational courses, 64% compared to 44% for males. The results of this study are encouraging for enrolling women in empirical studies, particularly for attendance and follow-up purposes.

Ethnicity. Consideration of participant ethnicity has had limited attention within the ASBI literature, however this section will discuss investigations that purposely examined the influence of participant ethnicity on ASBI efficacy. Sommers et al. (2006) discussed findings of a study of ASBI with trauma patients who had been involved in a motor vehicle accident. The main findings of that research are presented elsewhere in this chapter, however, of importance to ethnicity, the study revealed that where White participants had an attrition rate of 44%, African-American participants had an attrition rate of 67%. This large difference in attrition between the two ethnicities prompted the authors to note the need for more cultural sensitivity in future research.

In 1997, Burge et al. conducted a study investigating interventions provided to Mexican-American patients in a primary care setting. The study randomly assigned participants to four treatment groups: a brief intervention group offered by a physician, a psychoeducational group, the physician intervention and the psychoeducational group, and a control group. Enrollment was limited to only Mexican-Americans as the authors cite limited enrollment of this population within other intervention studies. After 18

months, the 175 participants participated in a follow-up interview. The results of the study showed mean improvement for all participants throughout the follow-up period, as measured by drinking patterns, psychosocial problems and physical laboratory tests. Burge et al. conclude that the screening process influences individuals to consider making changes in relation to their alcohol consumption. Although the authors found no significant difference between treatment groups, the results are promising that for this particular conversation, even brief exposure to discussing alcohol consumption can influence an individual to cut back.

Roudsari, Caetano, Frankowski, and Field (2009) conducted an investigation into the role ethnicity plays of ASBI efficacy with trauma patients. The authors enrolled a total of 1,493 patients, all self-identifying as White (45%), Black (19%), or Hispanic (36%). After being enrolled, participants were randomly assigned to either an assessment only group, or the assessment and brief intervention group. After a follow-up period of 12 months, Roudsari et al. did not find any association between patient ethnicity and brief intervention efficacy. In fact, the authors failed to find difference between the assessment only group and the intervention group, and cite limitations of the emergency department setting as a primary reason. Although this particular study revealed no difference between the three ethnic groups, the lack of efficacy for the intervention overall provides reason to continue investigation of ethnicity as a variable in question.

Although limited, the findings of the above inquiries into the role of ethnicity within ASBI empirical investigations are encouraging. Neither the Roudsari et al. (2009) report, or the Burge et al. (1990) report suggest eliminating particular ethnic groups from analysis. In effect the two work in conjunction with the call by Sommers et al. (2006), to

not only pay attention to ethnicity in empirical investigations, but to prioritize cultural sensitivity.

Injury type. Sommers et al. (2006) presented the results of randomized controlled trial of brief intervention efficacy following an alcohol-related vehicle accident and resultant injury. The researchers enrolled 187 participants and were able to follow-up with 100 at 12-month follow-up. The primary focus of the investigation was to test the efficacy of brief counseling, compared with simple advice, following a motor vehicle collision which resulted in a hospitalization. A control group was also utilized to measure group differences. The authors found a decrease in alcohol consumption across all three groups, similar to Roudsari et al.'s (2009). The mean number of standard drinks per month at baseline across groups was 56.80, and at follow-up this number decreased to 32.10. Mean binges per month also decreased from 5.79 to 3.21. Sommers et al. state that further work is needed to understand what is involved in reducing alcohol consumption as a variety of different reasons (i.e., the experience of the accident, the hospitalization, and the actual alcohol screening) potentially influenced each of these participants to report drastic reductions at follow-up.

Goodall et al. (2007) conducted an investigation concerning facial trauma among outpatient clinic patients in Scotland. The authors cited that in particular the reason for focusing on this particular traumatic injury is that there is a strong connection between excessive alcohol use and facial trauma, particular after a fall. The authors state that this is true not only in Scotland, but also in developed countries around the world. Goodall et al. enrolled 194 participants, and randomly assigned them to either a nurse-administered brief intervention group, or a group that received a pamphlet of information about alcohol

misuse. At 12 months, significant differences were found between the groups, with the intervention group showing a reduction in days spent drinking, and heavy drinking days. The results did not show a decrease in either group of the number of standard drinks taken on a typical drinking day. Further results of the Goodall et al. (2007) study found that the participants who had the highest AUDIT scores at baseline reported the most benefit from the intervention, as measured by the degree in change. The authors conclude that although this finding is counter to the notion that brief interventions are most effective for hazardous drinkers, and not dependent drinkers, it may be the actual injury itself that helps reinforce what is heard during the intervention. This study not only supports the notion of investigating the role certain injuries or mechanisms for injury have on individuals, but also supports the use of interventions for the severe-risk population.

Laboratory Tests. The predictive value of certain laboratory tests has been very limited within the literature of SBI studies. Many of the research protocols describe using certain tests (i.e., blood alcohol levels) to assist with identifying eligible participants, but examination of the influence of these as variables has not been common. In an examination of the predictive ability of the AUDIT, Conigrave, Saunders, and Reznik (1995) compared the AUDIT instrument to laboratory tests. These authors found that certain high levels of the gamma glutamyltransferase enzyme (GGT; produced by the liver) predicted patient mortality, although the AUDIT did not, but the GGT level did not predict any other outcomes under examination. That was the only identified use of any laboratory tests found within the SBI literature.

One criteria of alcohol dependence according to the DSM-IV-TR is tolerance,

which is defined by either: “a need for markedly increased amounts of alcohol to achieve intoxication or desired effect, or markedly diminished effect with continued use of the same amount of alcohol” (APA, 2000, p. 119). Although a blood alcohol level does not identify an individual’s increased tolerance, certain markers have been established that if reached would indicate a high tolerance. For example the level of 350 mg/dl (commonly known as 0.35) is the equivalent amount of general anesthesia an individual would receive if going to have surgery (Inaba & Cohen, 2007). If an individual had a blood alcohol level that high and was still able to perform basic physical acts (e.g., walking, talking) they show a high tolerance.

The use of drug screens (e.g., urine sample, hair sample) to determine SBI efficacy or as a predictor of treatment outcome has not been identified within the literature reviewed, although many alcohol abusers also use other drugs (Inaba & Cohen, 2007). In a study conducted by SAMHSA in 2006, 32.2% of heavy drinkers were also current users of illicit substances. There is a strong connection between both alcohol and other drugs, and the influence of other drugs as well as blood alcohol levels on the brief intervention process is in question.

External Characteristics Influencing SBI Efficacy

The following section will outline the variables that are not directly inherent to participants, however they become a part of the participant via participation in the research, also known as situation variables. Intervention type is the first variable to be reviewed which will be a component of the first research question in this proposal. The second research question will utilize the ten questions from the AUDIT instrument as predictor variables, and a review of these particular items will also be included below.

Chapter 3 will include a more thorough overview of the AUDIT instrument, including identification of relevant statistical properties.

Intervention Type. The following section will review the literature examining the difference between two or more different interventions within one study. Examples of different interventions include: advice versus brief intervention, telephone interventions, and computerized interventions. Although the majority of studies have focused on intervention compared to control, there has been attention paid to two or more intervention types.

Soderstrom et al. (2007) conducted a study analyzing brief advice versus a brief intervention for risky trauma patients. The brief intervention included a motivational interview, a feedback letter, and two phone numbers for contacts who could be reached after discharge. The advice group included a brochure and one phone number contact. After enrolling 497 participants and following up at 12 months, the researchers failed to find any significant difference between the two groups, with both groups reporting reductions in overall consumption, heavy drinking episodes, and consequences associated with their alcohol use. This finding is similar to other studies that failed to produce significant findings between treatment groups (i.e., Academic ED SBIRT Collaborative, 2007, 2010; Daeppen et al., 2007; D'Onofrio et al., 2008).

Monti et al. (2007) enrolled 198 patients to investigate the efficacy of a brief motivational intervention compared to only giving feedback to a patient whom presented to a Level I trauma center ED. The authors mention that enrollment was limited to individuals aged 18-24 years of age, however it is unclear why this was the case. The brief motivational intervention was rooted in motivational interviewing (Miller &

Rollnick, 2002) and also included telephone booster sessions at one and three months after enrollment, during which an assessment was conducted about current drinking and new goals were established with the participants. The one-month booster lasted approximately 20 minutes, with the three-month booster lasting approximately 30 minutes. The feedback group received personalized information about their drinking patterns, and comparative information for others their age. This was extremely limited in time, with the longest being three minutes. Participants in this group were also followed up with at the one and three month time mark, however the one month mark was to complete an assessment, and the three month one was to complete an assessment and receive a new feedback sheet with current feedback information for them. The only baseline difference between the groups was that the feedback-only group had slightly more years of education, but there was no other significant difference. In addition to the booster sessions, the participants completed follow-up assessments at six and twelve months following enrollment into the study. The final analysis revealed that the brief motivational intervention showed greater efficacy than the feedback only, as long as 12 months after the baseline enrollment period. For example, the brief motivational intervention group reduced their alcohol consumption from 45-53%, where the feedback only group reduced consumption by 11-18%. These findings significantly support the use of a brief motivational interview and booster sessions after discharge with individuals ages 18-24, within the ED setting.

Bischof et al. (2008) presented the results of a randomized clinical trial comparing a full care brief intervention with a stepped care approach. The stepped care approach begins with a very brief intervention and continually builds with intensity, with up to

three counseling sessions if needed. The full care brief intervention was described as the maximum effort of the stepped care approach. Participants were randomly assigned either to a control group (n=139), the full care brief intervention group (n=131), or the stepped care group (n=138). The control group was a pure control, receiving no treatment from the study providers. The full care and stepped care groups both received personalized feedback following enrollment. The full care participants then immediately received a brief intervention, grounded in Motivational Interviewing, that was a maximum of 30 minutes in length (Miller & Rollnick, 2002). After receipt of the feedback, the stepped care approach participants did not receive an immediate brief intervention; however, at one, three, and six-months the individuals were followed up with via telephone. If indicated, by no change in alcohol consumption or low self-efficacy of being able to make a change, then a brief intervention was conducted with the individuals. If the participants did reduce their consumption and reported a high self-efficacy to continue with the changes, no further contact was made until the 12-month follow-up.

Bischof et al. (2008) found significant support for providing brief interventions when comparing both of the intervention groups with the control group, and also found that a significant portion of individuals in the stepped care approach responded to the initial feedback after enrollment. Of particular interest to the current review was the finding that at-risk drinkers significantly decreased their alcohol consumption at 12-month follow-up, however, those diagnosed as alcohol dependent did not differ in reduction from the control group. The authors did not comment on the reduction that did occur, however in the provided data it is shown that within both the control and

intervention groups, those that were diagnosed as dependent did decrease their consumption, as measured by the average number of grams of ethanol consumed per day. Although this is not encouraging for the brief intervention per se, it is encouraging that a reduction in consumption occurred, and adds to the question concerning what spurs individuals to make this change.

There have been no definitive results produced from the comparison of two different types of brief interventions. Soderstrom et al. (2007), Monti et al. (2007), and Bischof et al. (2008) all produced empirically sound studies examining differences between different approaches. Two of these studies (Bischof et al., 2008; Soderstrom et al., 2007) did not produce significant differences between the treatment groups, and one did find support for one particular type of intervention with a foundation in Motivational Interviewing (Monti et al., 2007). The results are encouraging for continued empirical investigation of the differences between types of interventions in addition to theoretical orientation and skill level of the persons conducting the interventions. Particularly important is the impact of unique types of interventions on sub-populations, as Bischof et al. did find support for the at-risk drinkers, but not the more severe-risk drinkers.

Alcohol Use Disorders Identification Test (AUDIT). The AUDIT is the gold standard of alcohol screening in the world (Hodgson, Alwyn, John, Thom, & Smith, 2002). The second research question of this current study will examine the predictive value of each of the ten AUDIT questions. The following review outlines key studies that have found support for the use of the AUDIT questions as predictor variables.

The AUDIT instrument consists of ten questions, with three conceptual domains (Babor et al., 2001). Questions one through three identify hazardous alcohol use;

questions four through six identify potential markers of dependency; the remaining four questions cover harmful alcohol use. The difference between hazardous and harmful alcohol use is that hazardous use has the potential to cause alcohol-related difficulties due to the frequency and quantity of alcohol consumption, while the harmful use concept involves the actual experience of harm from use.

Conigrave, Saunders, and Reznik (1995) examined the predictive value of the total AUDIT score to predict illness and social problems, hospital admissions, and death rates over a 2-3 year period. At baseline, 330 participants were enrolled; the authors were able to follow-up with 76% (n=250) of them between 2-3 years. Findings of the study revealed that a total AUDIT score of eight was predictive of more alcohol-related social problems, medical complications, and hospital admissions. The authors did compare the AUDIT score with laboratory tests, and found that gamma glutamyltransferase (an enzyme produced by the liver that is often elevated with chronic alcohol abuse and liver damage) was a significant predictor of mortality within the population, but not the other variables under investigation. This study is particularly important for the current proposal as it examines the predictive value of the AUDIT, and finds support for the total score. The current study will look at each question individually to examine the questions' predictive value, compared to only the single total score.

Bush, Kivlahan, McDonell, Fihn, and Bradley (1998) examined the utility of using three of the ten AUDIT questions as a screen by itself. The three questions utilized by Bush et al. were: "How often did you have a drink containing alcohol in the past year?" "How many drinks did you have on a typical day when you were drinking in the past year?" "How often did you have 6 or more drinks on one occasion in the past year?" The

authors found that the three questions, known collectively as AUDIT-C (i.e., consumption), out-performed the full AUDIT to identify drinkers who would be good candidates for a primary care brief intervention due to its high sensitivity and specificity for heavy drinking. However, the full AUDIT was significantly better equipped to identify active alcohol abuse or dependence. The findings also supported the use of a single screening item, as the third question concerning binge drinking had "acceptable sensitivity and excellent specificity" (Bush et al., 1998, p.1792). The authors conclude that AUDIT-C is a useful screen especially when time constraints are a factor, and that when time constraints are under the utmost pressure, the single item is beneficial as a screen. These findings support the use of analyzing each AUDIT question individually, which is proposed in the second question under investigation currently.

Goodall et al. (2007) found significant results when conducting brief interventions with individuals who had experienced traumatic facial injury. These authors found significant results that suggested those with higher AUDIT score received the most from the intervention. In discussing the results, the authors hypothesize that it may be the injury itself that is a motivating factor influence behavior change. Although not specifically examined within this article, it brings awareness to include question number nine of the AUDIT within predictive analyses ("Have you or someone else ever been injured as a result of your drinking?"). Individual respondents have the choice to answer "No, Yes but not in the last year, or Yes and in the last year." If indeed results support the predictive utility of this question, focus of the intervention could be on the impact of this injury on the individual.

In an analysis examining moderators of treatment effect among emergency department patients, Walton et al. (2008) found that when individuals attributed their injury to alcohol use, the brief intervention was more efficacious. Similar to Goodall et al. (2007) these authors did not explicitly use the AUDIT instrument, however used another question to identify the belief of the injury being alcohol-related: "While drinking or intoxicated, I have been physically hurt, injured, or burned" (Walton et al., 2008, p. 552). Considering the findings of both the Goodall et al. (2007) and the Walton et al. (2008) study, there is significant support to utilize the question concerning alcohol-related injuries within a predictive analysis.

Desy, Howard, Perhats, and Li (2010) also found indirect support for one of the AUDIT questions. The authors conducted an investigation into using ED nurses to provide SBI services. In an observational finding, the authors noted that the individuals who expressed a feeling of guilt about their alcohol use were more likely to participate in the follow-up assessment conducted by the study team. This was assessed via the CAGE questionnaire, in which the third question asks, "Have you ever felt bad or guilty about your drinking?" Question number seven of the AUDIT asks, "How often in the past year have you have a feeling of guilt or remorse?" The similar nature of this question is encouraging for further exploration within a prediction study.

The AUDIT instrument is acknowledged as the gold standard in alcohol screening (Hodgson et al., 2002). The comprehensive nature of the assessment, while also being empirically valid and reliable is promising for utilizing in the current retrospective analysis. Further, although extremely limited, the findings from recent studies (i.e., Desy et al., 2010; Goodall et al., 2007; Walton et al., 2008) are promising for prediction studies.

Screening and Brief Intervention Predictors

Although there has been considerable attention to examining predictors of treatment success in traditional substance abuse settings, there has been a dearth of attention to predictors of ASBI success. With the limited attention however, there have been significant findings encouraging both for future research and influencing intervention procedures. The following studies have examined predictors of ASBI success.

Walton et al. (2008) examined a variety of predictors that may influence individual participants' weekly alcohol consumption, and consequences from alcohol use following ASBI. The research was conducted with 575 risky drinkers who received intervention in an ED setting, and had follow-up at two time points (three and twelve months). Findings support that individuals who attributed their injury to alcohol were more likely to reduce their heavy drinking days and had lower levels of weekly alcohol consumption, and that this was only true for the individuals who received the brief intervention, compared with those that received advice only (Walton et al., 2008). The authors highlight that this study increases the knowledge base regarding the mechanisms of change, and further provides an important area to focus the brief intervention.

Bertholet, Gaume, Faouzi, Gmel, and Daeppen (2011) assessed the predictive value of readiness to change, importance of changing, and confidence in ability to change on risk status six months following a brief intervention. The study was conducted in Switzerland, and enrolled 275 individuals with unhealthy alcohol use. Of the three variables examined, having a high confidence (score of 8-10, out of a 10 point scale) and having a high notion that reduction of alcohol consumption was important (also 8-10, out

of a 10 point scale) was associated with reduction in alcohol consumption at follow-up. The readiness to change variable was not shown to be predictive of changes at follow-up. Overall, 29% of those with unhealthy alcohol use no longer reported this at six-month follow-up. This study provides significant support for attending to specific participant beliefs to facilitate change.

Although not a study of ASBI efficacy, Apodaca and Longabaugh (2009) conducted a meta-analysis of motivational interviewing constructs and variables to examine which were most associated with client change after treatment. The results of the study highlighted that better outcomes were found when the client themselves discussed making changes, having intention to change, and having an experience of discrepancy (i.e., when current behavior is inconsistent with life goals/values). The results further found that counselor's inconsistency with MI skills during session predicted negative outcomes. Apodaca and Longabaugh produced significant findings that encourage future research to be directed at understanding key predictors of change with ASBI procedures.

Identification of predictors for ASBI efficacy is a needed area of focus for this field. Significant findings have the potential to inform future empirical studies, along with inform the current practice of ASBI. It is also of importance that attention is paid to predictors of ASBI efficacy within the different settings (i.e., primary care, emergency departments, trauma centers) as there may be key differences.

Summary and Conclusions

This chapter provided a comprehensive review of the history of brief counseling and alcohol treatment in the US. The historical review offered insight into the history of

developing new and efficient means for providing services to individuals, both mental health and addiction services. The findings of this review suggest that the development of alcohol BIs grew out of need to reach individuals whom were not being treated previously.

The literature was further reviewed regarding BIs with the severe-risk trauma patients. The findings of this literature review indicated that the severe-risk patients are often excluded from analysis, however when they are included, there are promising findings. Further examination of the predictor variables proposed for analysis was included, highlighting that although there has been examination of certain key factors (e.g., gender, ethnicity) and the impact these have on BI efficacy, there has been a lack of attention to examining key predictors of BI effectiveness.

This research project added to the literature by examining to the population of severe-risk drinkers who have until recently been excluded from studies related to BI efficacy. Additionally, predictors of severe-risk trauma patients' reduction in risky drinking level following a BI were examined, furthering the knowledge base of factors contributing to ASBI efficacy.

CHAPTER 3: METHODOLOGY

The following section will outline the research methodology. This study was a retrospective analysis, therefore the original study, *The Teachable Moment,* IRB-approved research protocol will be outlined, along with the current data analysis protocol. The primary aim of the original study was to test the efficacy of two different types of brief counseling interventions, and was completed using a randomized clinical trial research design.

The purpose of the retrospective analysis was to identify predictors of successful change in drinking outcomes for participants identified as severe-risk drinkers. The independent variables were acquired either at the baseline or through analysis of patient medical record six-months after enrollment. The dependent variable, self-reported reduction in severe-risk (AUDIT score >15) drinking to low-risk levels (AUDIT score <8), was assessed using the AUDIT (Babor et al., 2001) at a six-month follow-up via telephone. This chapter describes the participants, procedures used for data collection, instruments used for assessment, data analytic techniques, and concludes with a summary.

Participants

Subjects for this study included all eligible trauma inpatients admitted to the Trauma Service floor of a Level I Trauma Center in the southeastern US between January 5, 2009 and June 30, 2011. All adult patients (i.e., 18 years of age and older) were screened for potential eligibility. Both male and female patients of all races were

approached for enrollment if they met the prescreening criteria indicating risky drinking (note: criteria to be described in the following section). Patients were not approached if they were not of consenting age (i.e., less than 18 years old), had severe head injuries which precluded informed consent (i.e., a Glascow Coma Score less than 12 [a scale used to quickly determine medical and mental status in current use in trauma centers]), language barriers (i.e., did not speak English or Spanish), or did not meet prescreening criteria.

Inclusion Criteria

To enroll in the *Teachable Moment* study. participants must have: (a) been an inpatient admitted to the trauma floor, (b) been 18 years or older at the time of enrollment, and (c) spoke either English or Spanish. In addition, participants must also have met one or more of the following inclusion criteria: (a) answered yes to either nursing assessment screening question, (b) had a positive blood alcohol level (BAL) of ≤ 79 ml/dg and also had a positive AUDIT score (men ≥8; women ≥4), (c) had a BAL of 80 ml/dg or higher, or (d) had no record of a BAL on file but had a positive AUDIT score (men ≥8; women ≥4).

Four additional inclusion criterion were established for the purposes of the retrospective analysis. Participants, both genders, will be included in the current analysis if they have a total baseline AUDIT score of ≥ 16, had a Clinical Institute Withdrawal Assessment for Alcohol (CIWA-Ar; Sullivan et al., 1989) (see Appendix D) score greater than 7, and/or were administered medication to assist with alcohol withdrawal while in the hospital. In addition, the participants must have completed the follow-up phone call.

Exclusion Criteria

In order to ensure that individuals were appropriately enrolled into the study, several exclusion criteria were established. Individuals that (a) were unable or unwilling to provide informed consent, (b) refused to be contacted in six-months, (c) had a positive BAL ≤ 79 and negative AUDIT score (men <8; women <4), (d) were deemed unable to complete the brief intervention (e.g., decreased level of consciousness from head injury, medication, or psychiatric condition), (e) were younger than 18 years old, or (f) were not English/Spanish speaking were not included.

The current analysis further excluded participants if his or her AUDIT score at enrollment was < 16, if they did not have a CIWA-Ar score greater than seven, if they did not need any medical to assist with alcohol withdrawal while in the hospital, or if they did not complete the follow-up phone call at six-months.

The original study's final sample included 333 participants. The sample consisted of primarily male subjects (N=272; 81.7%), and included a variety of ethnicities: White (72.7%), African-American (21.0%), Latino (5.4%), and American-Indian (0.9%). The mean age of the enrolled participants age was 37 years. All enrolled participants had a baseline total score on the AUDIT (Babor et al., 2001). The current study will look specifically at the participants identified as severe-risk. As this is a unique subset, the results will not be generalizable to the larger trauma population.

Procedures and Design

The following diagram illustrates the sequence of procedures from the original Teachable Moment study:

Table 1: Teachable Moment Study Procedures and Design

In Emergency Department	Upon Admission to Trauma Service Floor	While on Trauma Service Floor	After Discharge
Blood Alcohol Level →	NSQ#1 NSQ#2 →	If eligible, Administered AUDIT → Offered BI (informed consent) → Intervention (Randomized) → BI#1 (QF) / BI#2 (Qual)	6 months Telephone Follow-up

In the original study, the *Teachable Moment* (TM), all trauma patients who were admitted to the Trauma Service floor were prescreened for eligibility. The prescreen process identified those eligible for the full screen (AUDIT), and if they met full eligibility, patients were then approached about participating in a research study. The essential elements of the prescreen included the blood alcohol level results and two alcohol-related nurse screening results. As part of the standard of care for trauma patients, a routine blood alcohol level (BAL) is drawn as part of their hospital admission panel. A positive BAL was identified as greater than five mg/dl (.005%). All adult trauma patients are also asked two alcohol-screening questions during their routine nursing admission assessment (1. "How many drinks do you have on a typical day when you are drinking" [positive is ≥ 4 for women, and ≥ 5 for men] and "How many days per week are you drunk?" [positive is ≥ 1 day per week]). Patients that scored positive on either initial prescreen were then further assessed via the AUDIT instrument. A chart review of lab results and nursing screening questions was conducted by TM-study approved study members to determine prescreening eligibility. If prescreening eligibility was met, the patient information was logged and color-coded in the TM database, the

counselor or counseling intern then met with the individual for alcohol screening and potential study enrollment.

Patient eligibility for potential enrollment in the original study was based upon a variety of factors. Factors include: a positive blood alcohol level (BAL, ≥ 80 mg/dl), a positive total AUDIT score (i.e., ≥ 4 for women, ≥ 8 for men), and/or a positive response to either of two alcohol-screening questions. The original study was designed to be a randomized clinical trial of two unique brief counseling interventions. Therefore, after consenting to the study, patients were randomly assigned into one of two intervention groups (i.e., quantity-frequency brief counseling intervention group, or qualitative brief counseling intervention group). The research team member enrolling each patient was provided with an envelope that was opened after the informed consent document (Appendix A) was signed. This envelope contained the information about which group the participant was randomized. This randomization was to one of two treatment arms, with no control group assigned. The Quantity/Frequency intervention arm (Q/F), was grounded in the NIAAA model focusing on reducing standard alcoholic drink consumption to low-risk levels (Females: <4 in any given day, and <8 in any week; Males: <5 in any given day, and <15 in any week). Discussion would focus on the individual's current drinking levels, and offer suggestions on ways to minimize his/her consumption. The counselor worked with the patient to identify goals the patient felt capable of achieving, and discuss further what would help the patient feel more confident in achieving the proposed changes. The Qualitative intervention (QUAL) arm focused on a subjective drunkenness, and exploring individual reasons/factors for getting drunk/overdoing it, and potential changes to identify healthier options to drunkenness.

This BI was much more about the individual's experience of drinking alcohol, rather than his/her consumption levels. The enrolled patients were contacted via telephone at the six-month mark for follow-up.

This follow-up included conducting the AUDIT assessment with a few additional questions included. One of the questions examined the participant's views of the changes they were able to make in regards to cutting down on alcohol consumption: "How successful have you been making changes with your drinking?" Results were scored on a five-point Likert scale, with a score of one being equivalent to "not successful at all," and a score of five representing "totally quit/major change." Another question was added to assess the participant's self-reported quality of life on a 10-point Likert scale, with a score of one representing "Horrible," a score of five representing "OK," and a score of ten representing "Great." The scripted protocol for the follow-up can be found in Appendix B. The research assistants that conducted the follow-up phone calls were blind to the participant's intervention arm at this time. The findings of the initial analysis revealed no difference in either treatment group; highlighting the experimental BI (i.e., QUAL arm) to be just as efficacious as the national standard (i.e., Q/F arm) (O'Brien, Reboussin, Veach, & Miller, 2012).

Current Research Design

The current research study utilized the data set that was established via the original research study. Upon receiving IRB approval (see Appendix E), the researcher deidentified the severe-risk participants and then created a new data set using the Statistical Package for Social Science (SPSS) computer software. Severe-risk patients had either a baseline total AUDIT scores greater than or equal to 16, had a CIWA-Ar

score greater than seven, or were administered medication to assist with medical withdrawal from alcohol while in the hospital and had to have completed the six-month follow-up questions. All identifying patient information from the original study has since been deleted, and therefore the identities of the original study participants were unknown to the researcher.

TM Research Design

If the patient declined the study, the counselor provided a brief counseling intervention following the traditional NIAAA quantity-frequency model, the hospital's routine standard of care procedures. If the patient agreed to participate, they were then given a copy of the informed consent to review. Upon reviewing the document, individuals were asked if they had questions or concerns, and after all questions had been identified and explained, the individual and the enrolling counselor signed the informed consent document. If an individual was unable to read or sign the document due to injury or reading ability, a nurse was brought in to witness the counselor read the entire document verbatim to the patient, witness vocal consent, and then sign a statement verifying the witness. The counselor then opened up the randomization envelope that identified which brief intervention group (i.e., QUAL or QF) the patient would be randomized into. The counselor then went through the pre-intervention paperwork (see Appendix C) and provided the brief intervention. Following the brief intervention, the participant was asked to complete a survey. The counselor then photocopied the original informed consent document, placed a copy in the patient's medical chart per Institutional Review Board (IRB) protocol, and gave a copy to the patient, while retaining the original document. The original documents were then turned over to the study's research

coordinator who facilitated all data entry. Two weeks before the six-month follow-up a reminder postcard was sent to each participant, reminding him or her of the upcoming follow-up phone call. A counselor on the staff, who was blinded to the participants' intervention group assignment, then conducted the follow-up phone call, and documented the self-reported answers on the follow-up form (see Appendix B).

Instruments

Risky drinking level was assessed in the original study via the AUDIT. The AUDIT was created primarily for use in health care systems, as a way to identify risky drinkers, along with identify the potential risk of dependence upon alcohol (Babor et al., 2001). The AUDIT consists of 10 items, broken into three conceptual domains (i.e., hazardous alcohol use, symptoms of alcohol dependence, and harmful alcohol use). Each item is scored on a five-point Likert scale (0-4), with a total score range of 0-40.

According to the manual, scores less than 8 indicate low-risk levels. Scores between 8 and 15 suggest risk associated with drinking, while scores of 16 through 19 indicate a need for continued monitoring. The range of scores from 20 to 40 is suggestive of potential alcohol dependence, with a need to conduct further intensive assessments for individuals that score within this upper echelon (Babor et al., 2001). The scores presented in the AUDIT manual are suggested guidelines proposed by the authors. Babor et al. (2001) state that it is appropriate to use clinical judgment when considering which cut-off scores may be appropriate for particular segments of the population. This clinical judgment was exercised within the original study, enrolling women at an initial score of four, which is noted to be lower than the suggested score of eight. Bradley, Boyd-Wickizer, Powell, and Burman (1998) suggested this score as being appropriate for

women after conducting a review examining the statistical properties of numerous alcohol screening questionnaires' (e.g., TWEAK, CAGE, AUDIT, MAST) sensitivities and specificities for women. Although this decision concerning females was made and exercised in the original study, it does not influence the proposed analysis as the inclusion criteria for this retrospective analysis includes a baseline AUDIT score greater than or equal to 16, regardless of gender. The AUDIT has extensive research concerning its validity and reliability, along with cross-cultural application, having been translated into 16 additional languages.

The Clinical Institute Withdrawal Assessment for Alcohol scale (CIWA-Ar; Appendix D) (Sullivan, Sykora, Schneiderman, Naranjo, & Sellers, 1989) was utilized to assess for alcohol withdrawal syndrome (AWS) per standard hospital protocol in the trauma unit. AWS is a life threatening acute brain syndrome, which impacts between 200,000-450,000 individuals each year (Doweiko, 2002). Management of AWS begins with a thorough assessment of the individual's drinking patterns, often conducted with the CIWA-Ar (Saitz, 1998). According to Saitz (1998) scores of less than eight on the CIWA-Ar assessment are mild in nature, with scores between eight and fifteen classified as severe. Patients that receive a score of greater than eight should be treated with medicine to reduce their risk of seizures or delirium tremens (Saitz, 1998). Saitz (1998) states that the CIWA-Ar assessment is the assessment of choice as the most validated measure of monitoring AWS.

Validity. The AUDIT instrument has been found to be a valid measurement of an individual's risk in relation to alcohol use. In terms of concurrent validity a correlation coefficient of .78 was reported between the AUDIT and the CAGE questions, another

short screening tool for alcohol risk (Babor et al., 2001). Bohn, Babor, and Kranzler (1995) reported a similar correlation of .88 between the AUDIT and Michigan Alcohol Screening Test (MAST), for both men and women.

Bohn et al. (1995) further evaluated the construct validity of the AUDIT according to the three constructs: risk factors, drinking consequences, and drinking attitudes. Overall, the authors report moderate to strong correlations between the constructs, however the risk factor construct was the most significant. Bohn et al. further noted that across all measures, men typically had stronger correlations than women. Lastly, Bohn et al. evaluated discriminant validity, by evaluating the significance of the instrument to discriminant harmful from nonharmful drinkers. The authors conducted an analysis of variance to examine this and reported a significant main effect of harmful drinking status on AUDIT score (F= 7.36, p<.01). Bohn et al. also evaluated the three domains of the AUDIT (i.e., alcohol consumption, dependence, and harmful drinking) to examine how well each is able to distinguish harmful drinkers from non-harmful drinkers. Bohn et al. report that each domain contributes separately to the power of the AUDIT to discriminate between harmful and nonharmful drinkers.

Lastly, Bohn et al. (1995) performed receiver operating characteristic (ROC) analyses to also determine the ability of the instrument to discriminate between harmful and nonharmful drinkers. The authors suggest that the findings show the results were significantly greater than would be expected by chance alone, with the AUDIT performing stronger (area under the curve [AUC] value= 0.90$\pm$0.03) than the MAST instrument (AUC value= 0.75$\pm$0.05). This additional ROC analysis highlights the

significant discriminant validity of the AUDIT to distinguish between harmful and nonharmful drinkers.

Reinert and Allen (2007) summarized the results of numerous studies examining criterion validity of the AUDIT in comparison to some other previously examined study. Twenty-six studies were included in this review, with four from outside the US (the United Kingdom and Nigeria) and the remaining 22 from within the US. The results highlight the strength of the AUDIT in terms of sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and AUC analyses. For example, Kelley et al. (2004) (as cited in Reiner & Allen, 2007) found the AUDIT to be an accurate screen for harmful alcohol use among emergency department patients 18-20 years of age with a recorded sensitivity of 0.87, a specificity of 0.65, a PPV of 0.60, a NPV of 0.88, and an AUC of 0.85. Other subgroups which the AUDIT was shown to perform accurately include: women, although a lower threshold for risk was suggested (Bradley, et al., 1998); a variety of ethnic groups (Reinert & Allen, 2007); adolescents (Knight et al., 2003); and the psychiatric population (Carey et al., 2003).

Reliability. The AUDIT instrument has been found to indicate high internal consistency within several studies (Conigrave, Saunders, & Reznik, 1995; Fleming, Barry, & MacDonald, 1991; Hays, Merz, & Nicholas, 1995). Sinclair, McRee, and Babor (1992) found a test-retest reliability of .88. The items within the AUDIT have also been rearranged to examine whether question order would affect scores, and the results did not support this, reflecting at least a minimum level of flexibility with the instrument (Babor et al., 2001).

Sensitivity and Specificity. Sensitivity and specificity refer to measures of power that an instrument or tool is able to accurately predict an outcome (Tabachnick & Fidell, 2007). Sensitivity refers to the percentage of positive cases an instrument accurately identifies, and specificity refers to the percentage of negative cases an instrument accurately identifies (Babor et al., 2001). The sensitivity reported for the AUDIT was found to be in the 0.90's during test development, and the specificity averages have been reported in the 0.80's through the different criteria and different countries worldwide (Babor et al., 2001). Overall, the AUDIT instrument has been found to be a statistically sound tool for conducting research related to problematic drinking.

Cut-off Scores

Cut-off scores were selected for the study in accordance with the manual and protocol of the AUDIT and CIWA-Ar assessments. The AUDIT manual (Babor et al., 2001) states scores less than eight are low-risk scores; scores between eight and 15 are risky; scores from 16-19 indicate that there is risk and the individual needs continued monitoring due to their alcohol risk level; and scores great than 20 indicate that an individual needs further assessment for potential alcohol dependence. Scores greater than 16 can therefore be clustered to highlight those individuals that are at an elevated risk level (i.e., severe-risk) as the manual suggests that the two sections (i.e., 16-19, 20-40) require additional involvement past the assessment phase. The score of 16 was chosen in this current study as the low threshold according to the AUDIT manual (Babor et al., 2001).

The CIWA-Ar assessment is a non-copyrighted tool utilized to assess for AWS. The total score is a 67, however a score of eight is when an individual requires medical

assistance to assist with withdrawal (Saitz, 1998). According to Saitz (1998), scores less than seven represent mild alcohol withdrawal, with scores between eight and 15 representing severe-withdrawal. The higher the score on the CIWA-Ar, the greater the likelihood of an individual to have a seizure or go into delirium tremens, a severe state of AWS that is life-threatening (Saitz, 1998). The score of eight was utilized in this study because it is the score associated with severe-withdrawal symptoms (Saitz, 1998), therefore representing severe-risk drinkers.

Research Questions

The research questions for this study are as follows:

1. To what extent do demographics, blood alcohol level at time of injury, presence of illegal substances in the patients' urine at time of injury, mechanism of injury, and type of intervention predict severe-risk drinkers' change in self-reported alcohol use to low-risk levels (AUDIT score <8) at six-month follow-up?
2. To what extent do hazardous alcohol use, symptoms of alcohol dependence, and harmful alcohol use predict severe-risk drinkers' change in self-reported alcohol use to low-risk levels (AUDIT <8) at six-month follow-up?

Data Analysis

The current study utilized the logistic regression (Tabachnick & Fidell, 2007) method for data analysis. The dependent variable under investigation is whether or not participants report reduction in risky drinking behaviors to low-risk levels (i.e., AUDIT score <8). The predictor variables in the first research question were age, gender, ethnicity, blood alcohol level, urine drug screen results, mechanism of injury, and intervention group assignment. The second research question used each AUDIT

assessment question as an individual predictor variable, Q1-10. Results from the analysis were able to indicate which predictor variables are able to distinguish those participants that self-report making changes with their drinking to low-risk levels (AUDIT score <8) from those that report no change in risk level.

Screening data. In accordance with multivariate statistics, all data was screened before analysis. Data was examined for accuracy of data entry, presence of outliers, missing values, and normality of distribution. Further, assumptions specifically relating to logistic regression were addressed.

Logistic regression. Logistic regression is a data analytic technique to utilize when the researcher is interested in predicting group membership with two or more independent variables (Tabachnick & Fidell, 2007). The dependent variable in this current analysis was group membership, which is dichotomous with two possible outcomes (either participants reduced consumption to low-risk levels or they did not). The goal of logistic regression is to find the best fitting model (grouping of independent variables) that predicts the dichotomous dependent variable. The independent variables in logistic regression can be a mix of dichotomous, continuous or discrete, even within the same research question. According to Tabachnick and Fidell (2007) the predictor variables do not need to follow the assumptions for other multivariate analyses (i.e., do not need to be normally distributed, linearly related, or have equal variance between each group) which makes the analysis more tolerant that other multivariate approaches.

Logistic regression, similar to other regression techniques, produces a regression equation that summarizes the relationship between the dependent and independent

variables (Guido, Winters, & Rains, 2006). The logistic regression equation is detailed here (Tabachnick & Fidell, 2002):

$$\hat{Y}_i = \frac{e^{A+B_1X_1+B_2X_2+B_3X_3}}{1+e^{A+B_1X_1+B_2X_2+B_3X_3}}$$

As the equation is written, the logit which is the linear portion of the model ($e^{A+B_1X_1+B_2X_2+B_3X_3}$)is used to find the odds of being in one category or the other, the dependent variable. In other words, the focus of logistic regression is on the probability of obtaining a given result category (Guido et al., 2006). In the current analysis, this category is whether or not severe-risk drinkers were able to reduce their alcohol consumption to low-risk levels, and the linear portion of the equation will be computed using the independent variables.

The overall model is tested via a goodness-of-fit test, such as the Hosmer-Lemeshow's test (Tabachnick & Fidell, 2007). If the model is a good fit to the data, then a non-significant Hosmer-Lemeshow's statistic will be present. Each individual independent variable is also examined to determine its significance in the model, which is conducted using the Wald chi-square statistic (Tabachnick & Fidell, 2007). The odds ratio provides information about each variable. That is, the odds of an outcome for one category, divided by the odds of the outcome for the other category. In the proposed analysis, an example is to calculate the odds ratio for both genders and if they were able to successfully reduce drinking to low-risk drinking, which will be divided by the number of men and women who were not able to reduce drinking to low-risk levels. The number produces the odds ratio, and the further this number is from 1, the more influential the predictor is (Tabachnik & Fidell, 2007). The odds ratio can also be utilized to estimate the effect size. In order to use the odds ratio as effect size, it first needs to be converted

to Cohen's d, and then can be converted to the eta-squared statistic. The following formula is used to find Cohen's d:

$$\ln(odds\ ratio)/1.81$$

This can then be converted to eta-squared:

$$\boldsymbol{\eta^2 = \frac{d^2}{d^2 + 4}}$$

Once eta-squared is computed, the following guidelines can be followed: small effect size (.01), medium effect size (.06), large effect size (.14) (Kim, 2011).

Sample size. Tabachnick and Fidell (2007) recommend the following formula to identify appropriate sample sizes for multiple regression: 50 participants + 8 participant*m; where m = the number of predictor variables. The final sample size of the Teachable Moment research study was 333 participants, and 140 of those meet the additional retrospective analysis criteria of a baseline AUDIT score of 16 or greater (Reboussin, personal communication, March 20, 2012). Of the 140 participants with a baseline AUDIT score greater than 15, 75 (53.6%) completed the six-month follow-up phone call. A 22% loss to follow-up was expected according to past similar research (Gentilello et al., 1999), however the actual loss was 46.4%, approximately two times that expected. A decision was then made to expand the inclusion criteria to include participants who had required medical assistance for alcohol detoxification while in the hospital, and who also completed the follow-up at six-months. This expansion included an additional 27 participants, resulting in an overall sample size of 102 participants, adequate for each respective research question according to Tabachnick and Fidell (2007).

Summary

The purpose of this research was to identify predictors of severe-risk drinkers self-reported change in drinking to low-risk levels six-months after a brief intervention in a hospital trauma unit. The retrospective analysis was conducted utilizing data obtained from a three-year randomized clinical trial. The following chapter outlined the participants, the procedures used for data collection, the instruments used for assessment, and the proposed data analytic techniques.

CHAPTER 4: RESULTS

The purpose of this study was to examine predictors of reduction in drinking risk level among severe-risk drinkers following a brief counseling intervention in an inpatient trauma unit. Specifically this study examined two research questions: (1) to what extent do demographics, blood alcohol level at time of injury, presence of illegal substances in the patients' urine at the time of the injury, mechanism of injury, and type of intervention predict severe-risk drinkers' change in self-reported alcohol use to low-risk levels (AUDIT score <8) at six-month follow-up, and (2) to what extent do hazardous alcohol use, symptoms of alcohol dependence, and harmful alcohol use predict severe-risk drinkers' change in self-reported alcohol use to low-risk levels (AUDIT score <8) at six-month follow-up. The first section of the chapter will be a descriptive report of the participants in the study. The second section will describe the results from the statistical analyses conducted to examine each research question. The chapter will conclude with a summary.

Retrospective Analysis

The current study utilized data from a larger study, entitled *The Teachable Moment,* which was funded by the Robert Wood Johnson Foundation and conducted in a three-year period from October 2008 to December 2011. That study sought to guide the development of alcohol screening and brief counseling intervention programs within medical trauma units. The original study, *The Teachable Moment*, enrolled participants of all risky drinking levels, including those that were risky and severe-risk, and

randomized these participants into one of two treatments. The purpose of the randomization was to examine two different brief interventions for risky alcohol use. The current analysis was solely interested in the severe-risk drinkers, a sub-set of participants, whom scored greater than 15 on the AUDIT instrument at baseline and/or needed medical assistance to withdrawal from alcohol while in the hospital. The target population of the current study is further discussed in the following section.

Description of Participants

The target population for this study was severe-risk drinkers who were hospitalized following a traumatic injury. Participants in this study were part of a larger randomized clinical trial in which drinkers of all risk-levels received a brief intervention while in the hospital to help reduce their individual risk associated with drinking alcohol. Of the 333 participants in the original study, 140 (42.04%) had baseline Alcohol Use Disorder Identification Test (AUDIT) scores of 16 or greater, with 75 (53.6%) of these individuals completing the six-month follow-up assessment. An additional 27 participants who completed the follow-up were identified as severe-risk from the original study due to receiving medical assistance for alcohol withdrawal while in the hospital. The descriptive frequencies are presented in Table 2. Prior to the data screening process, there were 102 participants available for each research question, after the removal of one outlier (described below), the final sample was 101 participants. The following are the descriptive statistics for this study sample.

Descriptive Statistics

The final sample size of participants after the removal of one outlier was 101 participants. Descriptive data of the demographics indicated that 84 (83.2%) were male

and 17 (16.8%) were female. Eighty-four (83.2%) were identified as being Non-Latino White, and 17 (16.8%) were identified as non-White. The mean age of participants was 39.72 years, with a SD of 12.08.

Thirty-seven participants (36.6%) were hospitalized as a result of a motor vehicle collision. Eleven participants (10.9%) were injured as a result of a motorcycle accident, and another eleven (10.9%) were injured from a fall. The remaining 40.4% consisted of injuries resulting from all-terrain vehicle accidents (*n*=8, 7.9%), moped accidents (*n*=7, 6.9%), pedestrians being struck by motor vehicles (*n*=6, 5.9%), assaults (*n*=14, 13.9%), and other serious injuries (*n*=7, 6.9%).

Blood alcohol levels (BAL) were drawn from 93 (92.1%) of the 101 participants. The mean BAL was 153.94 mg/dL, with a range from 0 mg/dL to 448 mg/dL. Sixty (59.4%) were placed on the Clinical Institute Withdrawal Assessment for Alcohol scale (CIWA-Ar) (Sullivan et al., 1989). Sixty-five participants (64.4%) were administered medication to assist with medical detoxification while in the hospital trauma unit.

The participants were randomized into one of two treatment groups according to *The Teachable Moment Study* research design. Forty-seven (46.5%) of the participants were randomized into the qualitative treatment group, and 54 (53.5%) were randomized into the quantity-frequency treatment group. The average length of brief intervention (BI) across both treatment groups was 30.56 minutes; the minimum length of BI was 15 minutes, and the maximum was 75 minutes.

Each participant was administered the AUDIT instrument at baseline and at six-month follow-up. The mean of the baseline AUDIT scores was 19.66 with a range of scores from 6 to 37. The mean of the follow-up AUDIT scores was 5.47, with a range of

scores from 0 to 35. The average change in AUDIT scores from baseline to six-month follow-up was a reduction of 14.2 points. Seven (7.0%) participants' AUDIT scores increased from baseline to follow-up (medium effect size of Cohen's *d*=-0.498), two (2.0%) remained the same (no effect size), and the remaining 92 (93.0%) participants' scores decreased (large effect size of Cohen's *d*=1.68).

Operational Definitions of Predictor Variables

Each variable was operationally defined in order to be analyzed utilizing the logistic regression analysis. The following is the coding definition for each predictor variable of the analysis by research question. The dichotomous outcome variable, whether participants reduced to low-risk level at six-month follow-up, was coded 0= no, and 1= yes.

Research question one variable coding

Each participant's corresponding values for the two continuous variables age and blood alcohol level were entered for analysis. Gender was coded dichotomously (0=male [reference group], 1=female); race was coded dichotomously (0=White [reference group], 1=Non-White); intervention group was coded dichotomously (0=qualitative intervention [reference group], 1= quantity/frequency intervention); mechanism of injury was coded categorically (0=automobile accident [reference group], 1=motorcycle accident, 2=moped accident, 3=all-terrain vehicle accident, 4=pedestrian struck by motor vehicle, 5=fall from height, 6=assault [including non-sexual assaults, sexual assaults, stab wounds, and gunshot wounds], 7=other serious injury [i.e., those unable to be categorized in any above category]). Due to the categorical nature of mechanism of injury it was then further coded utilizing parameter coding in SPSS, with automobile accident as the

reference category. Each category was then compared to the reference group (i.e., automobile accident) individually for analysis.

Research question two variable coding

The three variables utilized in research question two were continuous, with a range of scores. Hazardous alcohol use and symptoms of alcohol dependence were both scored on a twelve-point scale. A score of zero on the hazardous use scale reflects infrequent alcohol use and low-consumption levels; and a score of twelve on the hazardous use variable reflects alcohol consumption that is considered hazardous due to the frequency of high levels of use. A score of zero on the symptoms of alcohol dependence scale indicates never experiencing symptoms of alcohol dependence; and a score of twelve on the symptoms of alcohol dependence scale reflects an individual is reporting to experience symptoms of alcohol dependence at a much more frequent rate (i.e., daily or almost daily) than a score lower on the scale (i.e., never, less than monthly). Harmful alcohol use was scored on a sixteen-point scale. A score of zero reflects no harmful alcohol use, whereas a score of sixteen indicates harm associated with use (e.g., injuries, feelings of guilt and remorse, concern of family members) occurring more frequently and within the past year.

Table 2: *Descriptive statistics*

	N=101	
	n	%
Gender		
Male*	84	83.2
Female	17	16.8
Ethnicity		
White*	84	83.2
Non-White	17	16.9
Mechanism of Injury		
Automobile Accident*	37	36.6

Motorcycle Accident	11	10.9
Moped Accident	7	6.9
All-terrain Vehicle Accident	8	7.9
Pedestrian Struck by Motor Vehicle	6	5.9
Fall	11	10.9
Assault	14	13.9
Intervention Type		
Qualitative*	47	46.5
Quantity Frequency	54	53.5

Note: *= Indicates reference group for logistic regression analysis.

Data Screening

The Statistical Package for the Social Sciences (SPSS) software was used for data screening, descriptive statistics and logistic regression analyses. Prior to running the statistical analyses, the data were screened for outliers, missing data, normality, linearity, homoscedasticity of residuals, and collinearity. The continuous variables (i.e., age, blood alcohol level at time of injury, hazardous alcohol use, symptoms of alcohol dependence, and harmful alcohol use) were examined for normal distribution. An examination of the skewness and kurtosis values and a visual inspection of the frequency distributions suggested that the continuous variables were normally distributed. The means, standard deviations, skewness, and kurtosis are presented in Table 3. The point-biserial and Pearson correlation coefficients among the variables are reported in Tables 4 and 5 (Research Question 1) and Table 6 (Research Question 2).

Table 3: *Data screening of continuous predictor variables*

	M	SD	Range	Minimum	Maximum	Skewness	Kurtosis
Age	39.72	12.08	50	18	68	-0.055	-0.826
Blood Alcohol Level	153.94	104.03	448	0	448	0.171	-0.581
Hazardous Alcohol Use	8.45	2.524	10	2	12	-0.540	-0.411
Symptoms	2.80	2.853	11	0	11	1.066	0.441

of Alcohol Dependence							
Harmful Alcohol Use	8.38	3.967	15	0	15	-0.306	-0.760

Missing Data

Each variable was examined for missing data. Research question one included the variable BAL, which had eight missing cases. These missing cases were examined for a pattern using the missing values analysis in SPSS. The Little MCAR's test produced a non-significant (p=.357) result meaning there was a failure to reject the null hypothesis that the data were missing completely at random. Due to the missing data being completely at random, mean substitution was chosen as a method to estimate the missing cases. According to Tabachnick and Fiddell (2007), mean substitution is the most conservative approach to use, as the overall grand mean does not change. The mean BAL (M=153) was entered for the eight missing cases. The question also included the predictor variable Positive Urine Drug Screen. Thirty-three (32.7%) of the participants did not have a urine drug screen administered while in the hospital, representing a large portion of missing data. The decision was made to remove the variable from analysis. No cases had missing values among the variables included in the second research question.

Multivariate Outliers

The data were examined for multivariate outliers using Mahalanobis Distance. One case was identified as being a multivariate outlier in research question one by having a Mahalanobis Distance (MD) value (MD=75.014) greater than 15.09, identified as the

critical value of chi square (α=.001, *df*=5), which significantly diverged from the centroid. This case was removed prior to the analysis of the logistic regression analyses. No cases were identified as being multivariate outliers in research question two as all of the cases had Mahalanobis Distance values less than 9.21, identified as the critical value of chi square (α=.001, *df*=2), which significantly diverged from the centroid.

Multicollinearity

The data were examined for any potential multicollinearity issues using the collinearity diagnostics function in SPSS. The variables included in research question one were determined to have no issues with multicollinearity as there were only three variables that had variance proportions greater than .50, however none of these were on the same variable, nor did they correspond with large condition indexes. In addition, no condition indexes were larger than 10.49, much lower than the recommended cut-off of 30 (Tabachnick & Fiddell, 2007). The variables included in research question two were also examined for issues of multicollinearity, which was not found to be an issue. The largest condition index was 9.25, also lower than the recommended cut-off of 30, and there were no two variables that had corresponding variance proportions greater than .50.

Independence of Errors

The independence of errors was examined for each research question by visually inspecting a scatterplot of the residuals by the time order of the observations. There was no pattern found when examining the residual scatterplot (see Figure 2) for research question one, indicating independence of errors. The scatterplot of the standardized residuals for research question two (see Figure 3) did show a pattern of the residuals hovering either near 1.00 or between -1.00 and -2.00, however due to the observance of

the pattern remaining constant from the first case to the last (x-axis), independence of errors can be inferred as nothing significant changed over time.

Figure 2: *Residual scatterplot for research question one*

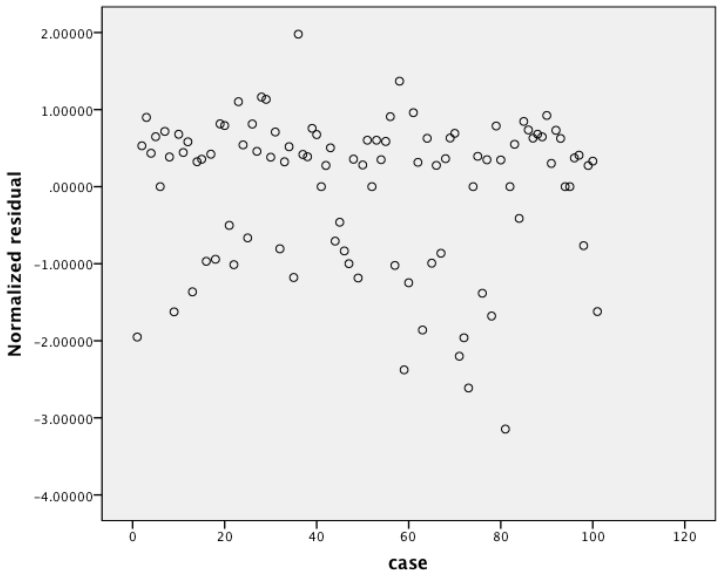
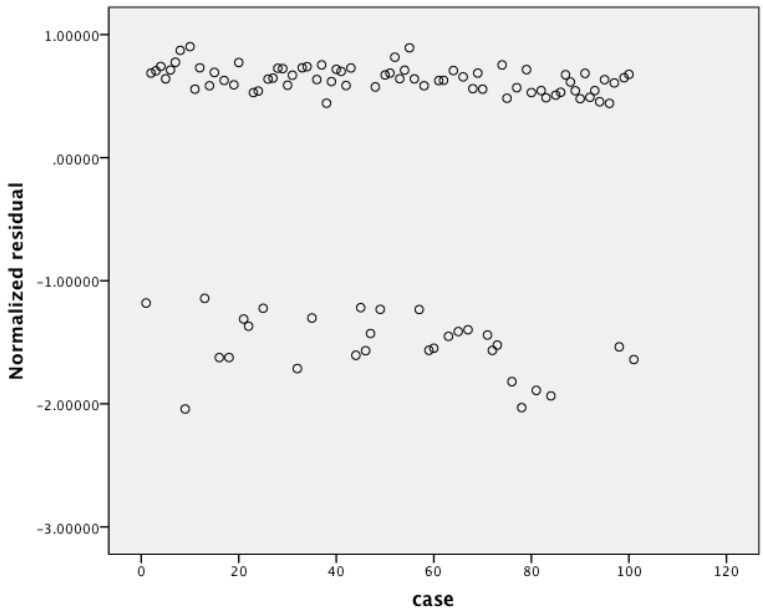


Figure 3: *Residual scatterplot for research question two*



Linearity of the Logit Form of the Dependent Variable

The linearity in the logit form of the dependent variable was examined to determine whether the regression equation had a linear relationship with the logit, as is required. After visually inspecting the scatterplots of the graphed logits for both research question one and research question two, it was determined that this was the case for both questions (see Figures 4-8 below). There was a linear relationship of the respective logits, as there was a clear pattern in the scatterplots for each of the corresponding continuous predictor variables.

Figure 4: *Scatterplot of graphed logit for age and the logit transform of the DV*

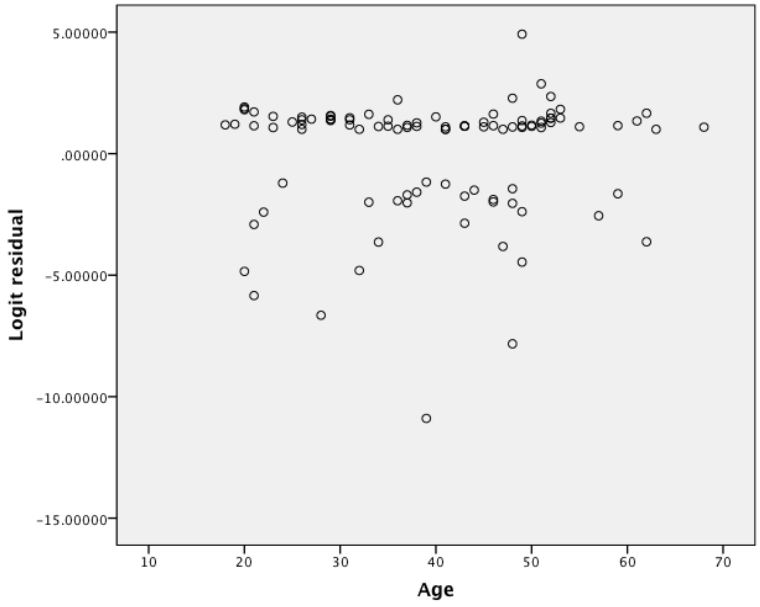


Figure 5: *Scatterplot of graphed logit for BAL and the logit transform of the DV*

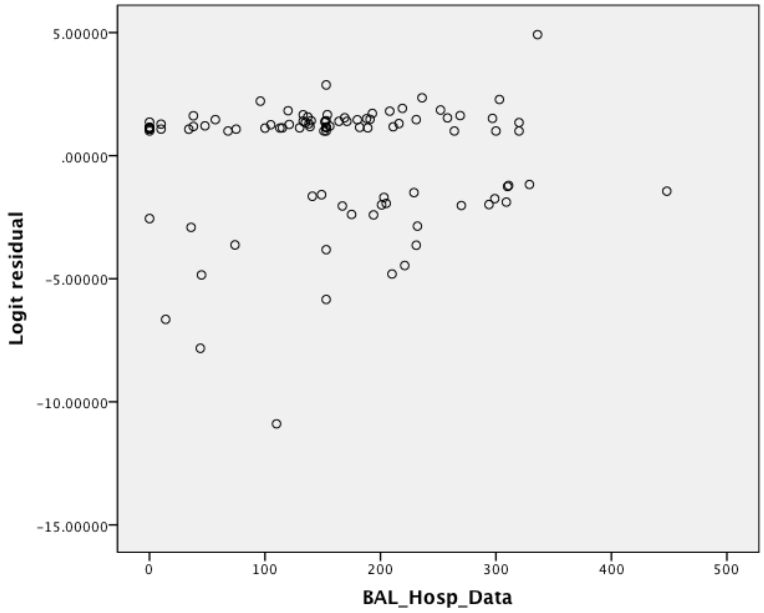


Figure 6: *Scatterplot of graphed logit for hazardous alcohol use and the logit transform of the DV*

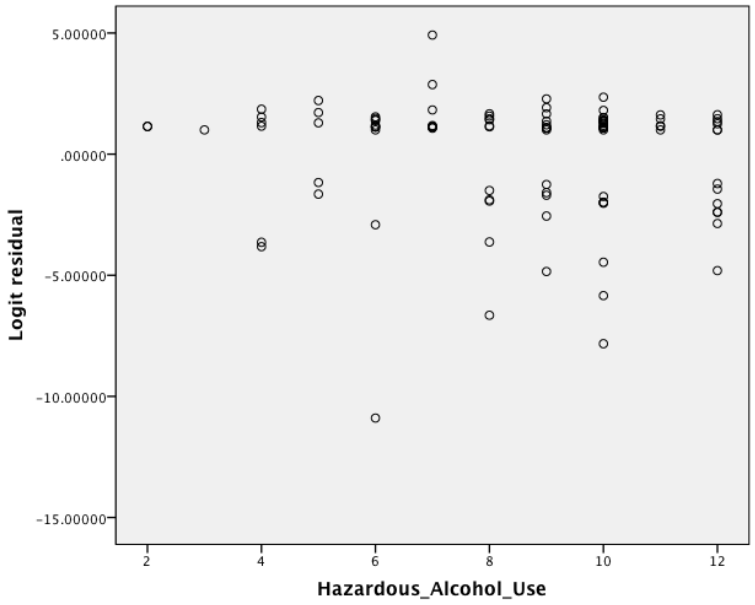


Figure 7: *Scatterplot of graphed logit for symptoms of alcohol dependence and the logit transform of the DV*

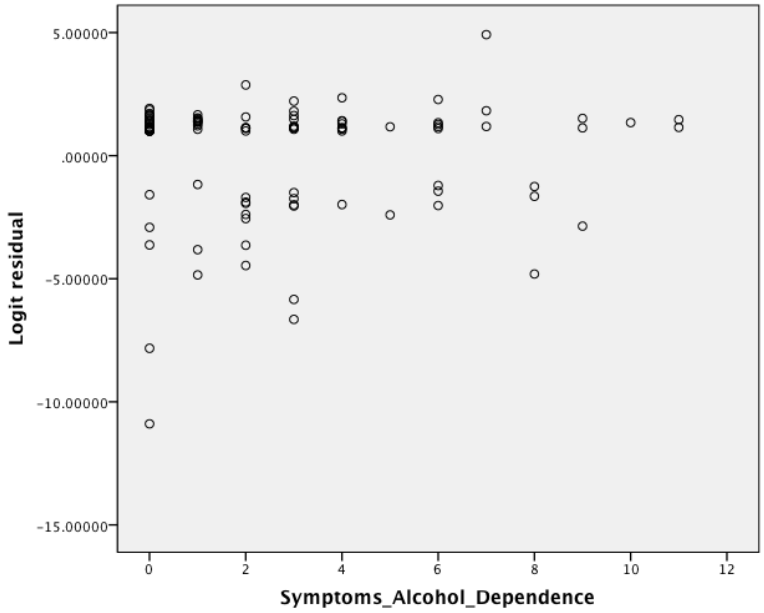
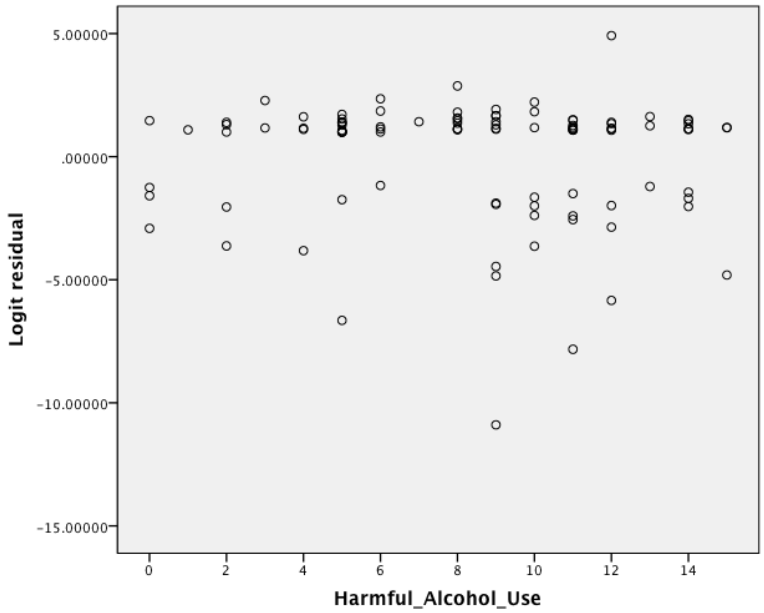


Figure 8: *Scatterplot of graphed logit for harmful alcohol use and the logit transform of the DV*



Bivariate Correlations

A point-biserial coefficient was conducted using the categorical predictor variables (i.e. gender, ethnicity, injury type, intervention type, hazardous alcohol use,

symptoms of alcohol dependence, and harmful alcohol use) and the outcome variable (reduction to low-risk drinking) separately for each research question. The point-biserial correlation matrix for the first research question is displayed in Table 5. A Pearson product-moment correlation coefficient was conducted using the continuous predictor variables (i.e., age, BAL, hazardous alcohol use, symptoms of alcohol dependence, and harmful alcohol use). The Pearson correlations for research question one are presented in Table 4, and the Pearson correlations for research question two are presented in Table 6. The continuous predictor variables were not found to be correlated in research question one. Research question two had numerous correlations among predictor variables, even though multicollinearity was found to be a nonsignificant issue.

Table 4: *Research question one bivariate Pearson correlations of continuous variables*

	Age	Blood Alcohol Level
Age	1.00	--
Blood Alcohol Level	.029	1.00

Table 5: *Research question two point-biserial correlations of categorical variables*

	1	2	3	4
1 Gender	1.00	--	--	--
2 Ethnicity	-.061	1.00	--	--
3 Injury Type	-.140	.079	1.00	--
4 Intervention Type	-.058	-.058	.092	1.00

*. Correlation is significant at the 0.05 level.

Table 6: *Research question two bivariate Pearson correlations of continuous variables*

	Hazardous Alcohol Use	Symptoms of Alcohol Dependence	Harmful Alcohol Use
Hazardous Alcohol	1.00	--	--

Use			
Symptoms of Alcohol Dependence	.303**	1.00	--
Harmful Alcohol Use	.231*	.546**	1.00

*. Correlation is significant at the 0.05 level.
**. Correlation is significant at the 0.01 level.

Analysis of Research Questions

The following section reports the results of the logistic regression statistical analyses, which examined the two research questions first presented in Chapter 1.

Research Question One

A direct logistic regression was conducted to predict whether participants reduced their alcohol consumption to low-risk levels at six-month follow-up from six predictor variables: age, gender, race, blood alcohol level at time of injury, mechanism of injury, and intervention type. Analysis was conducted using SPSS LOGISTIC REGRESSION. After using mean imputation for the eight cases with missing values on blood alcohol level at time of injury, and deleting one outlier from the data, data from 101 participants were available for analysis.

A test of the full model with all six predictors against a constant-only model was statistically non-significant, $x^2(5, N=101)= 20.491$, $p=.058$, indicating that the predictors, as a set, did not reliably distinguish between participants that reduced their alcohol risk level to low-risk at six-month follow-up (n=71) and those that did not reduce to the low-risk level (n=30). The Hosmer-Lemeshow goodness-of-fit test revealed that the predicted probability is the same as the observed probability $x^2(5, N=101)= 3.047$, $p=.931$. Although the overall set of predictors did not reliably distinguish the dependent variables,

the Cox and Snell R Squared indicated that 26.1% of the variance is explained by the predictors.

The regression coefficients, Wald statistics, statistical significances, degrees of freedom and odds ratios are reported in Table 7 for each predictor variable. Although the full model was not statistically significant, according to the Wald criterion, the continuous predictor variable Blood Alcohol Level (BAL) reliably predicted reduction to low-risk level, $x^2(1)= 5.71$, $p<.05$. However, the odds ratio of .99 shows little change in the likelihood of reducing to low-risk levels six months after a brief intervention on the basis of a one-unit change in BAL.

Due to the categorical nature of the variable Mechanism of Injury, each category was analyzed using SPSS LOGISTIC REGRESSION with categorical parameter estimates. The regression coefficients, Wald statistics, statistical significances, degrees of freedom and odds ratio are presented in Table 7. The reference group for this analysis was "automobile accident." No types of injury group reliably predicted reduction to low-risk levels, in comparison with the reference group.

Table 7: *Logistic regression output for research question one*

Variables in the Equation	*B*	*S.E.*	*Wald*	*df*	*Sig.*	*Exp(B) Odds Ratio*
Age	0.014	0.023	0.400	1	.527	1.015
Gender (Female)	0.753	0.742	1.028	1	.311	2.122
Ethnicity (Non-White)	-0.034	0.738	0.002	1	.964	0.967
Blood Alcohol Level	-0.007	0.003	5.713	1	.017*	0.993
Mechanism of Injury			6.343	7	.500	
Motorcyle Accident	0.058	0.935	0.004	1	.951	1.060
Moped Accident	0.877	1.201	0.533	1	.465	2.405
All-terrain Vehicle	-1.096	0.898	1.491	1	.222	0.334

Pedestrian Struck by a Motor Vehicle	20.342	15669.612	0.000	1	.999	682869154
Fall from Height	-0.775	0.825	0.883	1	.347	0.461
Assault	0.317	0.774	0.168	1	.682	1.374
Other Type of Injury	-1.607	0.974	2.940	1	.086	0.188
Intervention Type (Quantity-Frequency)	-0.230	0.505	0.207	1	.649	0.795
Constant	1.602	0.997	2.581	1	.108	4.964

Note: * = significant at a .05 alpha level.

Research Question Two

A direct logistic regression was conducted to predict whether participants reduced their alcohol consumption to low-risk levels at six-month follow-up from (a) hazardous alcohol use, (b) symptoms of alcohol dependence, and (c) harmful alcohol use. Analysis was performed using SPSS LOGISTIC REGRESSION. After deleting the one case identified as an outlier data from 101 participants were available for analysis.

A test of the full model with all three predictors against a constant-only model was not statistically significant, x^2(2, N=101)= 2.095, *p*= .553, indicating that the predictors of hazardous alcohol use, as a set, did not reliably distinguish between participants that reduced their alcohol risk level to low-risk at six-month follow-up (n=71) and those that did not reduce to the low-risk level (n=30). The Hosmer-Lemeshow goodness-of-fit test revealed that the predicted probability is the same as the observed probability x^2(2, N=101)= 4.966, *p*=.761. The regression coefficients, Wald statistics, statistical significances, degrees of freedom and odds ratios are reported in Table 8 for each predictor variable.

Table 8: *Logistic regression output for research question two*

Variables in the Equation	*B*	*S.E.*	*Wald*	*df*	*Sig.*	*Exp(B) Odds Ratio*

Hazardous Alcohol Use	-0.112	0.097	1.350	1	.245	0.894
Symptoms of Alcohol Dependence	-0.040	0.091	0.190	1	.663	0.961
Harmful Alcohol Use	-0.009	0.066	0.017	1	.897	1.009
Constant	1.872	0.904	4.285	1	.038	6.499

Summary

This chapter presented the results of the statistical analyses conducted for this research study. The purpose of this study was to examine predictors of reduction in drinking risk level among severe-risk drinkers following a brief intervention in an inpatient trauma unit. Descriptive statistics, bivariate correlations, and direct logistic regression results were included in this session.

The descriptive results of each question were presented, highlighting the majority of participants were male and of White ethnicity. The results of the logistic regression indicated that one predictor variable significantly distinguished participants who reduced to low-risk alcohol consumption levels at six-month follow-up. This variable was BAL, however, the odds ratio suggested that there is little likelihood in changing to low-risk levels after a brief intervention based on BAL alone.

CHAPTER 5: DISCUSSION

This research study sought to examine potential predictors of reduction in drinking risk-level among severe-risk drinkers following a brief counseling intervention as an inpatient of a hospital trauma unit. Specifically, the predictors that were examined included demographic characteristics, the mechanism of injury, blood alcohol level at the time of the injury, brief counseling intervention type, hazardous alcohol use, symptoms of alcohol dependence and harmful alcohol use. The predictors were examined to measure if they significantly predicted a severe-risk drinkers reduction to low-risk levels at six-month follow-up. The results of this study are discussed in this chapter. The sections include an overview, discussion of the study results, contributions, limitations and implications of the study findings, recommendations for future research and the chapter ends with concluding remarks.

Overview

Alcohol screening and brief counseling intervention (ASBI) services have been shown to have significant impact on reducing risk associated with alcohol consumption when exceeding the NIAAA (2010) recommended limits (Bien et al., 1993; Moyer et al., 2002). This is particularly true among hospitalized trauma patients (Gentilello et al., 1999; Gentilello, 2005). Significant outcomes for trauma patients include a reduction in alcohol consumption (Bien et al., 1993; Gentilello, 2005; Wilk et al., 1997), a reduction in trauma recidivism (Gentilello et al., 1999), and a reduction in overall healthcare costs

(Gentilello, 2007). It is important to investigate the factors that contribute to trauma patients' success of reducing their risk associated with alcohol consumption. There has been limited attention to the predictors of brief counseling intervention success within the literature.

The target population of most studies examining ASBI efficacy have focused solely on the risky drinker, and eliminated the more severe-risk drinker from participation in empirical studies. The reasons for exclusion of this sub-population have been minimally documented in the literature; moreover there is a general consensus that this population would not benefit from ASBI services (Guth et al., 2008, Heather, 2004). This is in stark contrast to Heather's (1995) statement that this population may benefit from these services due to the shorter time, and non-confrontational nature of the interventions. Increasingly specialists in the ASBI field are citing more research needs to be done to identify individual predictors of successful reduction in drinking outcomes following brief counseling interventions, and particular attention needs to be paid to the severe-risk population (McCambridge, Gual, & Heather, 2012).

The target population for this study included a sub-set of participants from a larger randomized clinical trial, the *Teachable Moment* study (O'Brien et al., 2012). This sub-set consisted of the participants identified as severe-risk drinkers (i.e., those who had a baseline AUDIT score greater than 15, and/or required medical assistance for detoxification from alcohol while in the hospital) who also completed the six-month follow-up phone call. All participants were administered the AUDIT (Babor et al., 2001) during the screening phase at baseline and follow-up, which measures risk associated with alcohol use. The total sample size of the original study was 333 participants, 140 of

whom had a baseline AUDIT score greater than 15 although only 53.6% of these individuals completed the follow-up assessment. The retrospective analysis included 102 severe-risk participants: 75 individuals who had a baseline AUDIT score greater than 15, and 27 who received medical assistance from alcohol withdrawal while in the hospital. All participants in the retrospective analysis completed the follow-up phone call.

Discussion of the Results

A discussion of the demographic data for the study will be presented first, followed by a discussion of the logistic regression analysis for each research question.

Discussion of the Demographic Data

An examination of the demographic data indicated a lack of gender and racial diversity among those included within the analysis. Most participants were white (83.2%) and male (83.2%). The average age of participants was 39.72 years. The standard deviation for age was 12.08. National data highlights a peak in trauma care utilization from the age of 14-29, and a second peak beginning at the age of 40 (American College of Surgeons, 2011). Considering the standard deviation and the average age, this current study appears on par with the national data in terms of age of participants. The data was also fairly consistent with the larger randomized control trial (O'Brien et al., 2012) that this current sub-set of participants was selected from, indicating a lack of demographic difference between the sub-set and the larger sample. The larger sample's participants were primarily male (81.7%), white (72.7%), and had an average age of 37.0 years. This data is also aligned with research that indicates that there is a greater percentage of males whom consistently show risky drinking patterns in

comparison to their female counterparts (Naimi et al., 2003; Naimi, Nelson, & Brewer, 2010).

The demographics of the current study are similar to other studies on ASBI efficacy with trauma patients. The participant's in Gentilello et al.'s (1999) landmark study were primarily male (82.1%) and were approximately 36 years old. Gentilello et al. did not report the ethnicity characteristics of their participants, beyond noting those not included were more likely to be non-white. Participants in the Schermer et al. (2006) study were slightly different than the current study with those participants primarily being male (62.9%), and the average age was 33 years, slightly younger than this study. Also, 20.63% of participants were identified as white, as compared with the majority in the current analysis. The difference noted in ethnicity between these two studies is most likely a result of geographic region, as the Schermer et al. study enrolled participants in the southwest locale of the US, which has a much larger native and Latino population.

Although the demographic results of the current study are semi-consistent with other trauma center studies of ASBI efficacy, there is no ability to generalize these results to any other trauma center or trauma population. Also, the lack of diversity among the sample size prevents generalizing these results to other trauma settings.

The average blood alcohol level of participants was 153.94 mg/dL. This computes to a BAL of .154, approximately two and a half times the legal limit, or the equivalent of seven and a half standard alcoholic drinks in the blood stream. The mean AUDIT score for participants was 19.66, above the severe-risk cut-off of 16 per the AUDIT manual (Babor et al., 2001). The mean BALs for the current study was slightly elevated from other trauma center ASBI studies although not much higher. Gentilello et

al.'s (1999) study reported an average BAL of 152 mg/dL, and the Schermer et al. (2006) reported a mean BAL of 153.5 mg/dL. It is important to note that the Schermer et al. (2006) study also enrolled participants identified as severe-risk. This importance of this is that the mean BALs are very similar across the two studies, indicating that although this current study limited analysis to only the severe-risk participants, the levels of initial intoxication was similar to the Schermer et al. study which also included a range of risk levels.

Discussion of Research Question One

A direct logistic regression was performed on reduction to low-risk levels (coded 0=did not reduce to low-risk levels [n=30] and 1=reduced to low-risk levels [n=71]) with six predictor variables: age, gender, ethnicity, blood alcohol level (BAL), mechanism of injury, and brief counseling intervention type. A test of the full model with all six predictors against a constant-only model was not statistically significant, x^2(5, N=101)= 20.491, p=.058, indicating that the predictors, as a set, did not reliably distinguish those participants who reduced their alcohol consumption to low-risk levels from those who did not. The variance in reduction to low-risk levels was small, with the Cox and Snell R^2 indicated that 26.1% of the variance was explained by the set of predictors. This left the remaining 73.9% of variance to be unexplained. Considering that the variables examined within this research question were all collected at baseline and before the intervention, further examination may consider whether it is the brief counseling intervention that accounts for the remaining 73.9% of variance.

The Wald criteria were examined for each predictor variable, which resulted in one significant predictor. The first of these predictors was BAL, a continuous variable.

The Wald criteria results, $x^2(1)= 5.71$, $p<.05$, suggested the significance of this variable, although the odds ratio of .993 suggested little change in the likelihood of reducing to low-risk levels six months after a brief counseling intervention on the basis of a one-unit change in BAL. An odds ratio of 1 suggests that there is equal probability that a reduction to low-risk levels would be based on a one-unit increase in BAL, therefore regardless of the level of BAL, individuals have the same statistical probability of reducing to low-risk levels. This indicates that it is potentially not the level of the BAL that has significance, but the ability of the counselor to use this piece of data within the brief counseling intervention which impacts the likelihood of individuals reducing to low-risk levels.

Although the demographic variables gender and race were not found to be significant within the logistic regression it is important to note the lack of variability among the sample in reference to these variables. The majority of the sample was male and White, this lack of variability suggests a possible contributing factor in the non-significant findings. The continuous variable age was also found to be non-significant as a predictor. On the basis of these results alone, the current study suggests that there are no stark demographic differences that would prevent a severe-risk drinker from reducing their alcohol consumption to low-risk levels following a brief counseling intervention as a trauma inpatient.

This analysis also examined whether the type of intervention (quantity-frequency or qualitative) would predict a reduction in drinking. This variable was found to be non-significant, suggesting the type of intervention did not predict whether participants would reduce to low-risk levels. This is similar to the results of the Teachable Moment study

(O'Brien et al., 2012), and further underscoring that the severe-risk drinker did benefit from either the traditional quantity-frequency counseling intervention or the explorative qualitative counseling intervention, as evidenced by the six-month follow-up showing 67.3% reduced to low-risk (AUDIT score <8).

The significant result of the BAL variable is encouraging, although due to the low odds ratio, there may be minimal inferences derived from the results. What is known is that there is a need to continue examination of the intoxication levels of individuals whom present to trauma centers. The importance and utility, if any, of how best to review the BAL findings with individuals during screening or brief counseling interventions would be notable to examine within the literature and in future research, as well as whether BALs exceeding 200 mg/dL or more may involve more intensive counseling interventions. Although BAL produced significant results within the logistic regression, the exact significance of this variable to predict reduction to low-risk levels is unknown.

What is notable about the examination of variables in research question one is that they were all collected during the screening phase of the ASBI procedure, and yet they accounted for only a fraction of the explained variance. This leads the current researcher to ponder whether the majority of the significance of ASBI is the counseling intervention component, regardless of the pattern of screening variables. This is encouraging as it highlights the overall utility of brief counseling interventions for a wide variety of individual characteristics (e.g., demographics, injury patterns, severity of drinking patterns).

Discussion of Research Question Two

A direct logistic regression was performed on reduction to low-risk levels (coded 0=did not reduce to low-risk levels [*n*=30] and 1=reduced to low-risk levels [*n*=71]) with a total of three predictors. The variables included within the second research question were hazardous alcohol use, symptoms of alcohol dependence, and harmful alcohol use. All of these variables are constructs of the AUDIT assessment (Babor et al., 2001), which is conducted during the screening phase of the ASBI.

The first variable was the predictor of hazardous alcohol use. The first three questions of the AUDIT instrument primarily inquire about the quantity and frequency of alcohol consumption patterns, and are the items that measure the construct of hazardous use (Babor et al., 2001). The second variable in question was symptoms of alcohol dependence, a construct measured by the second set of three questions on the AUDIT (Babor et al., 2001). The third variable in question was harmful alcohol use, the construct measured by the last four questions on the AUDIT (Babor et al., 2001). None of these variables were found to be statistically significant predictors of whether or not severe-risk drinkers would be able to reduce risk levels to low-risk following a brief intervention. This suggests that regardless of the way individuals answer these questions, they are just as likely to reduce to low-risk levels.

The lack of significant findings for these variables suggests that it is not the answers to these questions that are able to predict reduction to low-risk levels. Moreover, it is important to note that these questions were administered at baseline during the initial screening phase of ASBI, and may have occurred before a strong rapport was established

between the participants and the enrolling counselor. It is possible that the more severe-risk drinker takes a longer time to develop trust and rapport with the counselor.

Contributions of the Study

This study contributes to the literature base of ASBI in several important ways. First and foremost, this was one of the first studies to focus attention solely to the severe-risk drinker. Previous research into ASBI efficacy has limited analysis to risky drinkers excluding severe-risk drinkers. By focusing on the severe-risk drinker, this current study attended to a highly stigmatized population of alcohol users in an attempt to further understand ASBI, alcohol use and addiction.

Second, this study expanded the current knowledge base of ASBI efficacy. It is notable that over two-thirds of the participants in this study reported a reduction in drinking from baseline severe-risk drinking to low-risk level at the six-month follow-up. It has been suggested that individuals in the severe-risk category would not benefit from a brief counseling intervention (Fleming & Manwell, 1999; Soderstrom et al., 2007), however the results of this current study did find support for conducting ASBI services with these severe-risk alcohol users, with the majority of the participants reducing to low-risk levels. This further stimulates thought concerning what other limitations we have imposed on individuals with general assumptions and not empirical literature.

Third, this study examined predictors of ASBI efficacy for severe-risk drinkers. The results suggest that regardless of demographic characteristics (i.e., age, gender, race), severe-risk drinkers are able to reduce their alcohol consumption to low-risk levels. Also, the results indicate that BAL was a significant predictor, although further research is needed to understand sustained implications. The results did not find support for the

AUDIT questions asked during alcohol screening about hazardous alcohol use, symptoms of alcohol dependence, or harmful alcohol use as predictors for reduction in drinking. Although it is important to understand certain characteristics of individuals that would benefit from ASBI services, the lack of findings suggests that focusing too narrowly on specifics has the potential to exclude certain individuals from receiving beneficial services.

Fourth, this study furthered the knowledge concerning differing types of brief counseling interventions. There has been some attention in the literature to brief counseling intervention type, and the significance this has on outcome (Bischof et al., 2008; Monti et al., 2007; Soderstrom et al., 2007). This study furthered the original research findings that there was no difference between the two intervention types (O'Brien et al., 2012). The current analysis did not find that either of the two types of intervention predicted reduction to low-risk levels over the other, suggesting each of the intervention types have an equal importance with the severe-risk patients.

Lastly, approximately two-thirds (67.3%) of the participants reduced their drinking to low-risk levels. This is important to note because these participants reduced their risk level substantially, from severe-risk to low-risk, by overpassing the risky drinking level completely. When considering solely reducing AUDIT score, 93% of participants did reduce their AUDIT score at six-month follow-up, with the average reduction of approximately 14 points, representing a large effect size as measured by a Cohen's *d* value of 1.68. This measure suggests that this group of participants who reduced their AUDIT scores did score by reducing approximately 1.68 standard deviations. This indicates that overall there was a substantial decrease in risky drinking

as measured by the AUDIT, and further examination needs to consider these severe-risk patients. More research would add to furthering the knowledge of the key factors in ASBI.

Limitations of the Study

There are several limitations of this research study. First, this study was a retrospective analysis that used a pre-established dataset. The original research study included trauma patients from one southeastern trauma center who agreed to participate in the research. The generalizability of the results is limited to the particular trauma center where the study was conducted. The generalizability is further limited as a sub-set of severe-risk drinkers was chosen from the original research study.

Second, the outcome variable (i.e., if participants reduced alcohol consumption to low-risk levels at six-month follow-up) was collected via participant self-report. The self-report, subjective nature of the outcome variable increases the threat of self-report bias. In addition, it was not supported by any objective measure.

The third limitation of this study was the small sample size. In order to have an adequate sample size for logistic regression analysis, Tabachnick and Fidell (2007) recommend a sample of at least 50 participants + 8 participant*m; where *m* equals the number of predictor variables. Although this current study met the minimum requirements proposed by Tabachnick and Fiddell future studies should attempt to enroll a sufficient sample size in order to have adequate power to support multivariate analyses.

Conclusions of the Study

The first conclusion to be drawn from the current study is that severe-risk drinkers were found to reduce their drinking following a brief counseling intervention in a hospital

trauma unit. Although previous authors have argued that individuals with more severe problems with alcohol use would not benefit from a brief counseling intervention, the results that over two-thirds of this particular study sample reduced their risk level from severe to low counter that argument. In addition, there is evidence that there are alternative treatments (one of which is brief counseling intervention) to severe-risk drinking, beyond advanced specialized addiction treatment.

Finally, another conclusion of this study is that the beneficial component of ASBI services is potentially the intervention itself. The variables examined within this study were all collected prior to the intervention being conducted during the alcohol-screening phase. What is probable is that the one variable that was found to be statistically significant (i.e., BAL) was explored in the intervention itself, and thereby contributed to the impact of the brief counseling intervention underscoring the severity of the alcohol-related injury while capitalizing on the teachable moment. The results of this study point to the concept that the therapeutic connection that occurs in the brief counseling intervention itself may be the significant variable.

Implications of the Study

Trauma Care

The results of this study suggest that severe-risk drinkers are capable of reducing to low-risk levels following a brief counseling intervention in the trauma center. Currently the ACS (2006) guidelines do not stipulate who shall receive brief counseling interventions compared to those who should only receive referrals, however these results indicate there may be a need to clarify, or mandate, that all risky-drinkers (regardless of risk level) be administered brief counseling interventions within the trauma center.

It is notable that the individuals performing the counseling interventions in this study had specific training in counseling skills. They were all either masters- or doctoral-level counseling students, and were all under the supervision of a PhD-level counselor educator and supervisor, who had over 30-years of experience in the field of addictions counseling. It is possible the specialized training in counseling skills and specialized supervision assisted these enrolling counselors to work specifically with this severe-risk population.

Counselor Education and Supervision

The results of this study have important implications for the training and supervision of counseling students and professionals. First, the results presented here suggest that potentially the most important component of ASBI services is the intervention itself. Counseling students and professionals are well equipped to provide these services due to their understanding of foundational counseling skills (i.e., building rapport, reflection of content/feeling/meaning). Considering that a brief counseling intervention is essentially a brief counseling session, counseling students and professionals will benefit from understanding the impact that a purposeful discussion about reducing risky drinking can have, and be encouraged to utilize this service within their own practice.

All counseling students enrolled in programs accredited by the Council for Accreditation for Counseling and Related Education Programs (CACREP) are required to receive training in addiction, regardless of the student's specialty track (i.e., school, clinical mental health, student affairs, marital and family, or career) (CACREP, 2009). This study adds to the knowledge base for our understanding of how to treat severe-risk

drinkers. Although the general consensus was previously that these individuals had to seek a more advanced level of treatment (i.e., inpatient, intensive outpatient or outpatient counseling), this study highlights that one focused discussion about reducing alcohol consumption has been shown to be beneficial. This is important, as it challenges the knowledge of addiction treatment, of which counselors need to be exposed to. ASBI services overall are important for counseling students and professionals to gain exposure to, as they have been found to be successful as a prevention tool, and importantly as an alternative treatment equivalent for those with more severe-risk.

Recommendations for Future Research

The results of this study are encouraging for future research to be conducted with the target population of severe-risk drinkers. The first recommendation is that a large-scale multi-center randomized clinical trial be conducted, to fully examine the efficacy of ASBI services with severe-risk drinkers. The multi-site nature of the study will potentially allow for generalizability of the results if the sample is representative of trauma patients nationwide.

Second, it is recommended that future research explore ASBI efficacy among severe-risk drinkers in alternative settings. The current study was limited to the trauma center location, however other ASBI implementation efforts have occurred in emergency departments, primary care settings, and college student health centers. Expanding the focus to include severe-risk drinkers within these settings would expand the knowledge base of ASBI efficacy by treatment setting, along with risk level.

Third, it is recommended that more research focus on predictors of ASBI efficacy. The results of this study were encouraging to suggest that there may be particular

indicators (i.e., BAL) that a brief counseling intervention will be efficacious at six-month follow-up. By learning more about predictors of ASBI efficacy, especially pertaining to the counseling intervention itself, individuals may learn more about important elements to focus on during the interventions, which may boost their success.

Fourth, it is recommended that future research utilize a longer follow-up period beyond six-months. It is important to understand how long the effects of the brief counseling intervention last, and if not past the six-month period, additional research shall focus on the significance of additional booster brief counseling interventions either in-person, via telephone, or via the internet.

Fifth, it is recommended that future researchers consider a qualitative approach. Although typically qualitative research lays the groundwork for further quantitative studies, the results of this study suggest that there is a therapeutic benefit to the actual brief counseling intervention. Examination of the content of brief counseling interventions will contribute significantly to the literature and knowledge base by potentially highlighting what the effective elements of brief counseling interventions are.

Lastly, it is recommended that future research continue to examine ASBI efficacy overall. More research into ASBI efficacy for risky drinkers will continue to inform prevention efforts, and continued research into ASBI efficacy for the sub-set of severe-risk drinkers has the potential to inform addiction treatment and improve health and well-being at the opportune moments while hospitalized, for example.

Concluding Remarks

The physical, psychological, emotional and greater societal harms associated with risky alcohol use are widely acknowledged. There have been gains made in

understanding not only addiction treatment, but also the prevention of the disease, with ASBI services being the latest addition to the knowledge. Due to the beneficial outcomes to individuals and society, ASBI has been implemented into a wide range of settings, resulting in many positive benefits. While the implementation of these services has occurred, there has been limited attention to more severe-risk drinkers, who have been excluded from receiving these services. Furthermore, prior to this study there has been limited attention to predictors of brief counseling intervention success.

The results of this study imply that severe-risk drinkers can benefit from receiving a brief counseling intervention while hospitalized after a traumatic injury. Also, the results suggest there are significant variables that predict participants' reduction to low-risk levels at six-month follow-up, although these results were limited. This study provided support for continuing to examine ASBI efficacy, in particular, understanding the intervention in greater detail.

In closing, this study found that there are alternative treatment options for severe-risk drinkers who have been hospitalized following a traumatic injury. This expands the knowledge base of addiction treatment, as well as the knowledge base of prevention efforts. Continued research should concentrate on expanding the literature base of ASBI efficacy, particularly for sub-populations otherwise thought to not be suited for ASBI services. In addition, expansion of research methods will assist with this, as a qualitative research approach examining the content of brief counseling interventions will provide rich data from which further quantitative studies can expand upon. Conducting this type of research will continue to provide needed counseling services to individuals who

otherwise may not be receiving any clinical services, thereby giving a stigmatized and oppressed population a voice that has up until now been silenced.

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APPENDIX A: TEACHABLE MOMENT IRB APPROVAL FORM

WAKE FOREST
UNIVERSITY
HEALTH SCIENCES

THE TEACHABLE MOMENT: SCREENING AND BRIEF INTERVENTION FOR ADMITTED TRAUMA PATIENTS

Informed Consent Form to Participate in Research
Mary Claire O'Brien, MD, Principal Investigator

INTRODUCTION

You are invited to be in a research study. You are being asked to take part in this study because it appears from your answers to our routine questions that you might be consuming alcohol in a way that might be harmful to your health. Your participation in the research study is voluntary. Please take your time to make your decision, and ask the study staff or your study doctor to explain any words or information that you do not understand. You may also discuss the study with your friends and family.

WHY IS THIS STUDY BEING DONE?

The American College of Surgeons now requires screening for alcohol use in trauma centers. The purpose of this research study is to provide information about the best screening and treatment methods. We hope our findings will provide information that will improve healthcare by reducing problems related to risky alcohol use.

HOW MANY PEOPLE WILL TAKE PART IN THE STUDY?

We plan to enroll about 514 participants in the study. All of these will be at Wake Forest University Baptist Medical Center.

WHAT IS INVOLVED IN THE STUDY?

Once you have agreed to take part in the study, a trauma center counselor will talk with you further about your test results and your use of alcohol. The trauma team is conducting a comparison of two different ways of talking about your alcohol use. You will be randomized into one of the two study groups. Randomization means that you are put into a group by chance. It is like flipping a coin. You will have a 50-50 chance of being placed in either of the two study groups.

Both discussions will include your individual screening results and will suggest ways you might want to change your use of alcohol. Both discussions will talk about how injury and alcohol are related.

We will call all study participants about 6 months after the discussion. This is to ask again about your alcohol use and any problems you might have had after discharge that are possibly related to alcohol.

Audiotaping: As part of this research study, your brief counseling session might be audiotaped. The audiotapes are being collected randomly in order to learn how the counselors interact with the study participants. The research staff, including the counselors, will review these audiotapes. Your confidentiality will be respected and protected. The audiotapes will not be labeled with any identifying names or descriptions, and will be kept in a locked filing cabinet in the project office. Upon completion of the study, all audiotapes will be destroyed. You may request the recording be stopped at any time during the course of the research study or may ask to have previous audiotapes erased. You may withdraw your consent for us to use the audiotape after it is completed.

Because the tapes are collected at random, we will not know if your session is going to be audiotaped until after you agree to the research, but you may refuse to be audiotaped at that time, and still choose to participate in the study.

How Long Will I Be in the Study?

Both discussions are meant to be brief (less than 20 minutes.) The trauma center counselors are willing to talk with you longer, if you prefer.

We will call you on the telephone in approximately 6 months to ask about your alcohol use. That means that you will be in the study for approximately 6 months.

You can stop participating at any time. If you decide to stop participating in the study we encourage you to talk to the investigators or study staff first to learn about any potential health or safety consequences.

What Are the Risks of the Study?

You might become upset by being asked personal questions about your behaviors. The counselors have expertise in dealing with these reactions. Other studies have not found significant harms resulting from similar discussions. Taking part in this research study may involve providing information that you consider confidential or private. Efforts, such as coding research records, keeping research records secure and allowing only authorized people to have access to research records, will be made to keep your information safe.

The risk of harm or discomfort that may happen as a result of taking part in this research study is not expected to be more than in daily life or from routine physical or psychological examinations or tests. You should discuss the risk of being in this study with the study staff.

ARE THERE BENEFITS TO TAKING PART IN THE STUDY?

You will learn about healthy behaviors, and could acquire knowledge and skills that protect you against unhealthy behaviors. You will also receive written information about safe drinking. You will be informed about local alcohol counseling services.

We hope the information learned from this study will benefit other people in the future.

WHAT OTHER CHOICES ARE THERE?

Your alternative is to not participate in this study. If you choose not to participate in the study, the trauma center counselor will still offer to discuss your alcohol use (not as part of a research study.) We will also still offer you written information about safe drinking, and tell you about local alcohol counseling services.

WHAT ABOUT THE USE, DISCLOSURE AND CONFIDENTIALITY OF HEALTH INFORMATION?

All confidential patient information is protected by the Health Insurance Portability and Accountability Act of 1996 (HIPAA) and its regulations. The Code of Federal Regulations states that hospitalized patients must sign a specific permission form to permit disclosure of information related to alcohol treatment. Disclosure of confidential patient information is not permitted to employers or insurance providers without the specific written consent of the patient.

By taking part in this research study, your personal health information, as well as information that directly identifies you, may be used and disclosed to study personnel. The study personnel will keep all of this information confidential. Information that identifies you includes, but is not limited to, such things as your name, address, telephone number, date of birth. Your personal health information includes all information about you that is collected or created during the study for research purposes. It also includes your personal health information that is related to this study and that is maintained in your medical records at this institution and at other places such as other hospitals and clinics where you may have received medical care. Examples of your personal health information include your health history, your family health history, how you respond to study activities or procedures, laboratory and other test results, audiotapes and information from study sessions, and phone calls.

Your personal health information and information that identifies you ("your health information") may be given to others during and after the study. This is for reasons such as to carry out the study, to determine the results of the study, to make sure the study is being done correctly, and to provide required reports.

Some of the people, agencies and businesses that may receive and use your health information are the research sponsor; representatives of the sponsor assisting with the research; the Institutional Review Board; representatives of Wake Forest University Health Sciences and North Carolina Baptist Hospital; representatives from government agencies such as the Food and Drug Administration (FDA), the Department of Health and Human Services (DHHS), the Robert Wood Johnson Foundation (RWJF) and similar agencies in other countries.

Your name will not be stored with your answers in the study computer database.

You will not be directly identified in any publication or presentation that may result from this study.

Your discussion with the trauma center counselor will be kept completely confidential. Your answers may be discussed with individuals caring for you who are not part of the study (for example, other nurses or doctors involved in your care.) This will help in providing you with appropriate medical care. The information collected or created as part of the study will not be placed in your medical record.

Laboratory test results and other medical reports created as a result of your participation in the research study may be entered into the computer systems of Wake Forest University Health Sciences and North Carolina Baptist Hospital. These will be kept secure, with access to this information limited to individuals with proper authority, but who may not be directly involved with this research study.

When you sign this consent and authorization form you authorize or give permission for the use of your health information as described in the consent form. You can revoke or take away your permission to use and disclose your health information at any time. You do this by sending a written notice to the investigator in charge of the study at the following address:

Mary Claire O'Brien, MD
Medical Center Boulevard
Winston Salem, NC 27157-1089

If you withdraw your permission you will not be able to be in this study. If you withdraw your permission, no new health information that identifies you will be gathered after that date. Your health information that has already been gathered may still be used and disclosed to others as described in this form.

This authorization does not expire.

WHAT ARE THE COSTS?

There are no costs to you for taking part in this study. All study costs, including any procedures related directly to the study, will be paid for by the study. Costs for your regular medical care, which are not related to this study, will be your own responsibility.

WILL YOU BE PAID FOR PARTICIPATING?

You will be given a $15.00 gift card for completing the 6-month telephone follow-up call.

A post-card will be sent to you to remind you about the 6-month telephone call. We will use the address and phone number that you gave us when you were admitted to the hospital, unless you tell us you prefer differently.

WHO IS SPONSORING THIS STUDY?

This study is being sponsored by Robert Wood Johnson Foundation. The sponsor is providing money or other support to Wake Forest University Health Sciences to help conduct this study. The researchers do not have any direct financial interest in the sponsor.

WHAT ARE MY RIGHTS AS A RESEARCH STUDY PARTICIPANT?

Taking part in this study is voluntary. You may choose not to take part or you may leave the study at any time. Refusing to participate or leaving the study will not result in any penalty or loss of benefits to which you are entitled. If you decide to stop participating in the study we encourage you to talk to the investigators or study staff first to learn about any potential health or safety consequences. The investigators also have the right to stop your participation in the study at any time. This could be because it is in your best medical interest or the availability of new information.

You will be given any new information we become aware of that would affect your willingness to continue to participate in the study.

Whom Do I Call if I Have Questions or Problems?
For questions about the study or in the event of a research-related injury, contact the study investigator, Dr. Mary Claire O'Brien at (336) 716-4625 for (336) 713-9100 (after hours).

The Institutional Review Board (IRB) is a group of people who review the research to protect your rights. If you have a question about your rights as a research participant, you should contact the Chairman of the IRB at (336) 716-4542.

You will be given a signed copy of this consent form.

SIGNATURES

I agree to take part in this study. I authorize the use and disclosure of my health

information as described in this consent and authorization form. If I have not already received a copy of the Privacy Notice, I may request one or one will be made available to me. I have had a chance to ask questions about being in this study and have those questions answered. By signing this consent and authorization form, I am not releasing or agreeing to release the investigator, the sponsor, the institution or its agents from liability for negligence.

_____

Subject Name (Printed)

_____ _____

Subject Signature Date

_____ _____

Person Obtaining Consent Date

APPENDIX B: POST INTERVENTION FORM

The Teachable Moment
Post Intervention Form
(Telephone Follow-Up)

Participant Study # _____

Date follow-up post card was mailed _ _ / _ _ / 20 _ _ (mm/dd/yyyy)

Was postcard returned to sender (study team) as undeliverable? ☐ Yes ☐ No

Patient able to complete follow-up telephone call ☐ Yes
☐ No **REASON**: _____

Patient willing to complete follow-up telephone call ☐ Yes
☐ No **REASON:** _____

Hi _____, I am calling today to ask you a few questions since your discharge from WFUBMC Trauma Center. You may recall giving us permission to contact you 6 months after your hospital stay as part of our research study about different ways to talk with people about their alcohol use.

Please answer the following questions thinking about the time since you left the hospital – these are the same questions we asked when you were in the hospital.

Because alcohol use can affect your health and can interfere with certain medications and treatments, it is important that we ask some questions about your use of alcohol. Your answers will remain confidential so please be honest. Please think about your drinking **in the past 6 months** and remember that a drink means one beer, one small glass of wine (5 oz.), or one mixed drink containing one shot (1.5 oz.) of spirits.

Questions		0	1	2	3	4
1.	How often do you have a drink containing alcohol?	Never	Monthly or less	Two to four times a month	Two to three times a week	Four or more times a week

What do you usually drink? _____

2.	How many drinks containing alcohol do you have on a typical day when you are drinking? Number of drinks ☐	1 or 2	3 or 4	5 or 6	7 to 9	10 or more
3.	How often do you have five or more drinks on one occasion?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily

In a typical week, how many days do you get drunk? By drunk, we mean "dizzy, unsteady, or sick to your stomach." ☐

How many drinks can you hold? ☐

Questions		0	1	2	3	4
4.	How often during the past 6 months since your discharge from the hospital have you found that you were not able to stop drinking once you had started?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
5.	How often during the past 6 months since your discharge from the hospital have you failed to do what was normally expected from you because of drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
6.	How often during the past 6 months since your discharge from the hospital have you needed a first drink in the morning to get yourself going after a heavy drinking session?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
7.	How often during the past 6 months since your discharge from the hospital have you had a feeling of guilt or remorse after drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
8.	How often during the past 6 months since your discharge from the hospital have you been unable to remember what happened the night before because you had been drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
9.	Have you or someone else been injured as a result of your drinking in the past 6 months since your discharge from the hospital?	No				Yes

How were you injured? If someone else was injured (not participant), check here, once. ☐	(check all that apply, for participant)	Did you seek medical treatment for your injury?
automobile accident	☐	☐
motorcycle accident	☐	☐
bicycle accident	☐	☐
moped accident	☐	☐
all-terrain vehicle accident	☐	☐
pedestrian (you) hit by someone else's motor vehicle	☐	☐
fall from a height	☐	☐
sexual assault	☐	☐
non-sexual assault	☐	☐

assault involving intimate/domestic partner	☐	☐
stab wound	☐	☐
gunshot wound	☐	☐
burn	☐	☐
other serious injury	☐	☐

Questions		0	1	2	3	4
10.	Has a relative or friend, or a doctor or other health worker been concerned about your drinking or suggested you cut down in the past 6 months since your discharge from the hospital?	No				Yes

TOTAL MODIFIED (6 month) AUDIT SCORE _____

How successful have you been making changes with your drinking, compared to before your injury?

Scale:

1	2	3	4	5
Little to No Change	Some Change	Moderate Change	Many Changes	Totally Quit/ Major Change

On a scale of 1-10, how well is your life going at this time?

Scale:

1	2	3	4	5	6	7	8	9	10
Terrible				OK, Fine				Going extremely well	

APPENDIX C: PRE INTERVENTION FORM

Participant Study #

The Teachable Moment
Pre Intervention Form

What is the reason for your current hospitalization?	(check all that apply)	Was this the result of your drinking? (Check if yes)
automobile accident	☐	☐
motorcycle accident	☐	☐
bicycle accident	☐	☐
moped accident	☐	☐
all-terrain vehicle accident	☐	☐
pedestrian (you) hit by someone else's motor vehicle	☐	☐
fall from a height	☐	☐
sexual assault	☐	☐
non-sexual assault	☐	☐
assault involving intimate/domestic partner	☐	☐
stab wound	☐	☐
gunshot wound	☐	☐
burn	☐	☐
other serious injury	☐	☐

Not including this hospitalization, in the past 6 months, have you experienced an injury due to any of the following?

	☐ No	☐ Yes (check all that apply)	Was the injury the result of your drinking? (Check if yes)	Did you seek medical treatment for your injury? (Check if yes)
automobile accident	☐	☐	☐	☐
motorcycle accident	☐	☐	☐	☐
bicycle accident	☐	☐	☐	☐
moped accident	☐	☐	☐	☐
all-terrain vehicle accident	☐	☐	☐	☐
pedestrian (you) hit by someone else's motor vehicle	☐	☐	☐	☐
fall from a height	☐	☐	☐	☐
sexual assault	☐	☐	☐	☐

non-sexual assault	☐	☐	☐	☐
assault involving intimate/domestic partner	☐	☐	☐	☐
stab wound	☐	☐	☐	☐
gunshot wound	☐	☐	☐	☐
burn	☐	☐	☐	☐
other serious injury	☐	☐	☐	☐

Please verify your contact information for us?

Home address:

We will mail your reminder postcard to this address, 2 weeks before we call you for your telephone follow-up. This is also the address we will use to mail your $15.00 gift card, after you complete the telephone follow-up. Please tell us if you prefer us to use a different address.

_____

_____

(If this is **not** the patient's home address, specify whose address was given.)

_____

Telephone contact numbers:

Home phone: _____ ☐

Cell phone: _____ ☐

Other (specify): _____ ☐

In 6 months, for the telephone follow-up, do you prefer that we call you at home, on your cell phone, or at another number? (check patient's preferred contact number, above)

APPENDIX D: CIWA-AR PROTOCOL

Patient:_____ Date: _____ Time: _____ (24 hour clock, midnight = 00:00)

Pulse or heart rate, taken for one minute:_____ Blood pressure:_____

NAUSEA AND VOMITING -- Ask "Do you feel sick to your stomach? Have you vomited?" Observation.
0 no nausea and no vomiting
1 mild nausea with no vomiting
2
3
4 intermittent nausea with dry heaves
5
6
7 constant nausea, frequent dry heaves and vomiting

TACTILE DISTURBANCES -- Ask "Have you any itching, pins and needles sensations, any burning, any numbness, or do you feel bugs crawling on or under your skin?" Observation.
0 none
1 very mild itching, pins and needles, burning or numbness
2 mild itching, pins and needles, burning or numbness
3 moderate itching, pins and needles, burning or numbness
4 moderately severe hallucinations
5 severe hallucinations
6 extremely severe hallucinations
7 continuous hallucinations

TREMOR -- Arms extended and fingers spread apart. Observation.
0 no tremor
1 not visible, but can be felt fingertip to fingertip
2
3
4 moderate, with patient's arms extended
5
6
7 severe, even with arms not extended

AUDITORY DISTURBANCES -- Ask "Are you more aware of sounds around you? Are they harsh? Do they frighten you? Are you hearing anything that is disturbing to you? Are you hearing things you know are not there?" Observation.
0 not present
1 very mild harshness or ability to frighten
2 mild harshness or ability to frighten
3 moderate harshness or ability to frighten
4 moderately severe hallucinations
5 severe hallucinations
6 extremely severe hallucinations
7 continuous hallucinations

PAROXYSMAL SWEATS -- Observation.
0 no sweat visible
1 barely perceptible sweating, palms moist
2
3
4 beads of sweat obvious on forehead
5
6
7 drenching sweats

VISUAL DISTURBANCES -- Ask "Does the light appear to be too bright? Is its color different? Does it hurt your eyes? Are you seeing anything that is disturbing to you? Are you seeing things you know are not there?" Observation.
0 not present
1 very mild sensitivity
2 mild sensitivity
3 moderate sensitivity
4 moderately severe hallucinations
5 severe hallucinations
6 extremely severe hallucinations
7 continuous hallucinations

ANXIETY -- Ask "Do you feel nervous?" Observation.
0 no anxiety, at ease
1 mild anxious
2
3
4 moderately anxious, or guarded, so anxiety is inferred
5
6
7 equivalent to acute panic states as seen in severe delirium or acute schizophrenic reactions

HEADACHE, FULLNESS IN HEAD -- Ask "Does your head feel different? Does it feel like there is a band around your head?" Do not rate for dizziness or lightheadedness. Otherwise, rate severity.
0 not present
1 very mild
2 mild
3 moderate
4 moderately severe
5 severe
6 very severe
7 extremely severe

AGITATION -- Observation.
0 normal activity
1 somewhat more than normal activity
2
3
4 moderately fidgety and restless
5
6
7 paces back and forth during most of the interview, or constantly thrashes about

ORIENTATION AND CLOUDING OF SENSORIUM -- Ask "What day is this? Where are you? Who am I?"
0 oriented and can do serial additions
1 cannot do serial additions or is uncertain about date
2 disoriented for date by no more than 2 calendar days
3 disoriented for date by more than 2 calendar days
4 disoriented for place/or person

Total **CIWA-Ar** Score _____
Rater's Initials _____
Maximum Possible Score 67

 This assessment for monitoring withdrawal symptoms requires approximately 5 minutes to administer. The maximum score is 67 (see instrument). Patients scoring less than 10 do not usually need additional medication for withdrawal.

Sullivan, J.T.; Sykora, K.; Schneiderman, J.; Naranjo, C.A.; and Sellers, E.M. Assessment of alcohol withdrawal: The revised Clinical Institute Withdrawal Assessment for Alcohol scale (**CIWA-Ar**). *British Journal of Addiction* 84:1353-1357, 1989.

APPENDIX E: IRB APPROVAL LETTER

UNC CHARLOTTE

Office of Research Compliance

9201 University City Boulevard, Charlotte, NC 28223-0001
t/ 704.687.3311 f/ 704.687.2292 www.research.uncc.edu/comp/complian.cfm

Institutional Review Board (IRB) for Research with Human Subjects

Approval of Exemption

Protocol #	**12-11-05**			
Title:	**Examining Predictors of Severe-risk Drinkers Reduction in Drinking Outcomes at Six-month Follow-up Following a Brief Intervention**			
Date:	**11/26/2012**			
Responsible Faculty	**Dr.**	**Laura**	**Veach**	**Counseling**
Investigator	**Ms.**	**Regina**	**Moro**	**Counseling**

The Institutional Review Board (IRB) certifies that the protocol listed above is exempt under category 4 (45 CFR 46.101).

Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.

This approval will expire one year from the date of this letter. In order to continue conducting research under this protocol after one year, the "Annual Protocol Renewal Form" must be submitted to the IRB. Please note that it is the investigator's responsibility to promptly inform the committee of any changes in the proposed research, as well as any unanticipated problems that may arise involving risks to subjects. Amendment and Event Reporting forms are available on our web site: http://research.uncc.edu/compliance-ethics/human-subjects/amending-your-protocol or http://research.uncc.edu/compliance-ethics/human-subjects/reporting-adverse-events

M. Z. 12/3/12

Dr. M. Lyn Exum, IRB Chair Date