

# Alcoholism : are we losing the battle?

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Alcoholism: Are we losing the battle?

Tabitha Lynn Taylor

The University of Toledo

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## Dedication

This paper is dedicated my fiancé, Chris, for his constant support and inspiration.

Thank you to my family for always believing in me.

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## Introduction

Excessive alcohol use is associated with 75,000 deaths per year in the United States, making it the third most common lifestyle behavior linked to death in the United States (United States Centers for Disease Control [CDC], 2006a). For women, excessive alcohol use is defined as greater than three drinks during one sitting (binge drinking) or more than seven drinks per week, on average (heavy drinking). For men, excessive alcohol use is classified as more than four drinks at one time or an average of greater than 14 drinks during a week. A standard drink may consist of 12 ounces of beer or wine cooler, eight ounces of malt liquor, five ounces of wine, or one and a half ounces of liquor; all of which contain approximately half an ounce of pure alcohol (CDC).

“Results from the 2006 National Survey on Drug Use and Health” found that of Americans 12 years or older, 50.9 percent admitted to being current drinkers, 23 percent had binge drank in the last month, and 6.9 percent reported heavy drinking (Department of Health and Human Services [HHS], 2006). The same survey indicated the following: 3.9 percent of 12 to 13 year olds, 15.6 percent of 14 and 15 year olds, 29.7 percent of 16 and 17 year olds, 51.6 percent of 18 to 20 year olds, and 68.6 percent of 21 to 25 year olds reported current use of alcohol. After this peak use during early adulthood, use of alcohol tended to decrease as age increased.

Alcohol use is very common in the U.S., especially among younger individuals, and unfortunately, it can be associated with numerous acute and chronic health risks (CDC, 2006a). Common instant health risks may include accidental injuries, violence, unsafe sexual behaviors, unplanned pregnancy, and alcohol poisoning, all of which include multiple facets (CDC). Chronic health problems may include neurological, cardiovascular, social, psychiatric, and

gastrointestinal problems as well as liver disease and cancer (CDC). Healthy People 2010 has set guidelines for decreasing the amount of alcohol use in the United States (HHS, n.d.).

While the majority of the population is able to use alcohol without severe consequences, some individuals cannot. The *DSM-IV-TR* defines the critical feature of substance abuse as a “maladaptive pattern of substance use manifested by recurrent and significant adverse consequences related to the repeated use of substances” (American Psychiatric Association, 2000). This problem must recurrently occur over the same 12-month period or be continual. The *DSM-IV-TR* defines alcohol dependence as a “cluster of cognitive, behavioral, and physiological symptoms indicating that the individual continues use of substance despite significant substance-related problems”. Furthermore, “there is a pattern of repeated self-administration that can result in tolerance, withdrawal, and compulsive drug-taking behavior”. Similar to alcohol abuse, alcohol dependence criteria must occur within a 12-month period. Alcohol use disorders (may involve alcohol abuse or alcohol dependence) remain widespread in the United States, and they account for a number of severe health problems (Hasin, Stinson, Ogburn, & Grant, 2007; CDC, 2006a). Approximately one third of individuals in the United States endure an alcohol use disorder (AUD) in their lives, while eight and a half percent of adults had suffered from an AUD in the past year according to a study conducted in 2001-2002 (Hasin et al.). The NIAAA reports similar data, stating that about one in every 12 adults in the United States abuses alcohol or suffers from alcohol dependence (National Institute on Alcohol Abuse and Alcoholism [NIAAA], 2007).

The National Institute on Alcohol Abuse and Alcoholism (NIAAA) defines alcoholism as a chronic disease that involves the following four symptoms: craving, loss of control, physical dependence, and tolerance (2007). Craving is characterized by a very powerful need to drink

alcohol, and loss of control means that an alcoholic is unable to control the amount of alcohol that he or she consumes after initiating drinking. Physical dependence is when an individual begins to experience withdrawal after cessation of alcohol consumption, and tolerance may be described as the necessity to drink additional alcohol each time to obtain the same desired effect. There are numerous factors that may increase one's risk of developing alcoholism, including both genetics and lifestyle (NIAAA, 2007). Family history of alcoholism, male gender, being a younger adult, marijuana use, early onset of drinking, and being unmarried, separated, or divorced all increase the risk of developing an AUD (Grant, Stinson, & Harford, 2001). Furthermore, psychosocial and psychiatric disorders have also been associated with alcohol dependence (Sartor, Lynskey, Heath, Jacob, & True, 2007).

Alcoholism is a chronic disease without a cure, but it can be treated (NIAAA, 2007). There are a variety of treatment programs for alcoholic patients that may involve both medications and counseling. In fact, the best approach for these patients is to completely abstain from the use of alcohol, as a true alcoholic is unable to simply cut down or control his or her drinking. While alcohol treatment can be very successful for some individuals, many others continue to struggle with their disease and suffer relapses, even after remaining sober for a substantial period of time (NIAAA). Although some patients suffer a relapse after being abstinent for a long time, it is true that the longer an individual stays sober, the more likely he or she will be able to continue to do so (NIAAA). The current review looked at a variety of prevention and intervention techniques currently executed to determine which methods produce decreases in alcohol use among adolescents. Risk factors for AUDs were evaluated in hopes to determine which individuals should especially be targeted and to identify which types of treatment would benefit these adolescents the most.



### *Problem statement*

Alcohol use, abuse, and dependence are very common in the United States and are associated with numerous adverse effects. Interventions focusing on prevention of alcohol use in adolescents may decrease the number of alcohol use disorders, and therefore adverse effects, experienced later in life.

### *Purpose*

The purpose of this literature review was to determine risk factors for development of alcohol use disorders and to determine types of prevention that can effectively reduce the risk for these individuals.

### *Scope*

This review focused on risk factors associated with alcohol use problems including, but not limited to genetics and family history, age of onset of alcohol use, environment, and lifestyle. This review also investigated various types of alcohol prevention programs and interventions used for preadolescents and adolescents. Original research articles and information from the National Institute of Alcohol Abuse and Alcoholism and the Centers for Disease Control were the main sources of information used in this review.

### *Literature review*

Researchers have determined that many different genes may play a role in an individual's risk for developing alcoholism (National Institutes of Health [NIH], n.d.). While there are genes that may increase one's risk, there are also genes that may decrease an individual's risk of alcohol dependence (NIAAA, 2005; NIH). Native Americans have the highest risk of alcohol dependence during their lifetimes, and whites are more likely than African Americans and Asians to have an AUD (Alcohol Use Disorder) (Hasin et al., 2007). It is likely that genetics

play a role in these patterns. Use of alcohol may be affected by many different mechanisms which include, but are not limited to neurotransmitters, “neuromodulators, hormones, and intracellular networks” (NIH).

Children with an alcoholic parent are approximately four times more likely than children without a family history of alcoholism to develop an AUD (NIAAA, 2005). While genetics play a role, the actions and examples set by the parents also play an important role in the child’s future. A child’s risk of developing alcoholism increases if he or she experiences violence in the home, if both parents have AUDs, if the alcoholic parent has psychological comorbidities, and with an increased severity of the parent’s AUD. However, an increased risk and a poor home environment do not mean that a child of an alcoholic is guaranteed to develop an alcohol use disorder; fortunately, many children do not.

The CDC reports that approximately one half of all high school students consume alcohol (2006b). A national study found that 41 percent of eighth grade students and three fourths of high school seniors have tried alcohol (CDC, 2006b). Problems in school, social difficulties, legal issues, physical problems, assault, risky sexual activity, and abnormalities in physical and sexual development have all been associated with underage alcohol use. In addition to these difficulties, adolescents who use alcohol also have a higher risk for suicide, homicide, car accidents, unintentional injuries, memory problems, abuse of other substances, chronic problems resulting from abnormal brain development, and life-threatening alcohol poisoning (CDC). By providing early intervention to decrease alcohol consumption among adolescents, it may be possible to decrease the prevalence of these alcohol-related problems.

The CDC suggests that such prevention calls for help from the community to both keep an eye out for the behaviors of adolescents and also to help prevent adolescents from obtaining

alcohol (2006b). Such community efforts could be carried out via national, state, and local efforts and could involve decreasing alcohol advertising, media campaigns focused on prevention for adolescents, increasing taxes on alcoholic beverages, and also decreasing availability of alcohol for individuals who are underage.

Many other types of prevention and intervention approaches have been studied. This literature review investigated the variety of family, school, and community based approaches for the continuing problem of an overwhelming amount of alcohol use among adolescents. Upon combining information regarding risk factors and successful interventions, it is hoped that future interventions can especially be aimed at those individuals who are at an increased risk of developing an alcohol use disorder. Furthermore, this review aims to help parents with children at increased risk for AUDs by guiding them toward interventions in which success has been verified.

### *Research Question*

What are the risk factors for developing an alcohol use disorder, and what methods of prevention are successful in these at-risk individuals?

### *Definitions*

Alcohol Use Disorder (AUD)- This term can be used to describe alcohol abuse or alcohol dependence (*DSM-IV-TR*)

Alcohol Abuse- A “maladaptive pattern” of alcohol use “manifested by recurrent and significant adverse consequences related to the repeated use” of alcohol. This problem is recurrent over the same 12-month period or is continuous (*DSM-IV-TR*).

Alcohol Dependence- A “cluster of cognitive, behavioral, and physiological symptoms indicating that the individual continues use” of alcohol “despite significant” alcohol-

related problems. “There is a pattern of repeated self-administration that can result in tolerance, withdrawal, and compulsive drug-taking behavior” and the criteria for this disorder must be met within the same 12-month period (*DSM-IV-TR*)

Alcoholism- A chronic disease that involves craving, loss of control, physical dependence, and tolerance (NIAAA, 2007).

Craving- A very powerful need to drink alcohol (NIAAA, 2007).

Loss of Control- Unable to control the amount of alcohol consumed after beginning to drink (NIAAA, 2007).

Physical Dependence- An individual begins to experience withdrawal symptoms after cessation of alcohol consumption (NIAAA, 2007).

Tolerance- The need to drink increasing amounts of alcohol each time to obtain the same desired effect (NIAAA, 2007).

### *Methodology (Procedures)*

The search engines used for this review included MEDLINE, PubMed, the OhioLINK Electronic Journal Center, and PsycINFO. The main search terms used include: alcoholism, family history, risk factors, prevention, alcohol use statistics, adolescents, intervention, and child of alcoholic.

## Literature Review

### *Consequences of Alcohol Use in Preadolescence and Adolescence*

During the adolescent years, neurological development continues to occur. As a result, use of alcohol during this time may jeopardize normal neurological development (Brown, Tapert, Granholm, & Delis, 2000). It is likely that exposure of the central nervous system to neurotoxins (such as alcohol) affects teens differently than it does adults for this reason. Adults are no longer developing and cognitively maturing, but since teens are, they are at a higher risk of damage to these crucial processes. Proper development and maturation may be disturbed or hindered by exposure to these types of neurotoxins during adolescent development. Furthermore, use of alcohol also increases the risks of head trauma and dropping out of school (Brown et al.). Brown et al. conducted a study to determine the effects of alcohol on the adolescent brain. They recruited alcohol dependent adolescents and young adults from alcohol treatment programs and surrounding areas on the west coast. These individuals met DSM-III-R criteria for alcohol dependence. They had used alcohol over 100 times in their lives and had at least one episode of heavy drinking in the past three months. These individuals had consumed excessive amounts of alcohol during adolescence, when neurological development is typically occurring. The comparison group for the study consisted of individuals without any history of drug or alcohol disorders. The alcohol dependence group consisted of 33 individuals, while the comparison group contained 24 participants. The two groups were comparable on the following factors: age, gender, socioeconomic status, education level, family history of substance dependence, and maternal alcohol use during pregnancy. In each group, 58 percent of the individuals were males and 70 percent of the participants were Caucasian. Participants were excluded if any of the following criteria were met: lack of parental consent, residence greater than 50 miles from the

research center, presence of an Axis I psychological disorder prior to substance use, history of significant head trauma with loss of consciousness greater than two minutes, neurological condition that may affect the performance on the testing used in the study, did not speak English, and a history of excessive drug use or dependence.

The researchers conducted the study as follows. The first method of measurement was a 90-minute interview which obtained information regarding demographics, school performance, social contacts, overall health, and feelings toward substance abuse (Brown et al., 2000). Information about maternal alcohol use while participants were in utero, mood, and family history of drug and alcohol dependence was also collected. Secondly, information about substance use was obtained. Substance use over the prior three months and also lifetime use was determined. The researchers also asked about problems which resulted from drug and alcohol use, evaluated the participants based on criteria for substance abuse and dependence from the *DSM III-R* and *DSM-IV*, and obtained information regarding withdrawal symptoms resulting from drug and alcohol use by the participants. Finally, the researchers administered a “neuropsychological test battery.” This battery consisted of multiple tests which assessed levels of verbal and nonverbal learning and memory, visuospatial function, language proficiency, attention, and ability to solve problems. All of these measures were assessed during the third week of the inpatient treatment for the alcohol dependent teens, so alcohol intoxication was not a factor in the outcomes. Aside from the assessment of the participants, a “resource person” was used to verify the participants’ histories, family histories, and also information about substance abuse by the participants.

Adolescents with a history of alcohol dependence and withdrawal performed significantly worse on neuropsychological tests than their peers without histories of alcohol use disorders

(AUDs). The participants with histories of alcohol dependence (AD) had an average of 753 episodes of alcohol use over a total of five years, and they also consumed larger quantities of alcohol when drinking than their peers. They also had experienced more symptoms of alcohol withdrawal than the control group (Brown et al., 2000). Number of withdrawal symptoms and performance on the neuropsychological (NP) tests were inversely related; as withdrawal episodes increased, NP performance decreased ( $p < .05$ ). On the intelligence scale, vocabulary, information, and coding were significantly worse in the AD group than in their peers without AD ( $p < .01$ ). Ability to perceive similarities was also poorer in the AD group ( $p < .05$ ). The alcohol dependence participants used fewer “semantic learning strategies,” ( $p < .05$ ) had poorer retention, ( $p < .05$ ), and poorer “visual reproduction retention rates” ( $p < .01$ ) than the control group. In addition to these findings, the researchers examined how depressed mood interacted with the factors examined and how it affected NP performance. Depressed mood was found to be associated with withdrawal ( $p < .01$ ) and poor retention ( $p < .05$ ). The researchers discuss that this relationship means that mood changes related to alcohol may affect “neurocognition.” There was no difference between the alcohol dependent and control participants on new verbal learning.

The results of this study suggest that a history of alcohol dependence and withdrawal affects memory, “visuospatial cognition,” and verbal skills (Brown et al., 2000). Decreased retention and visuospatial cognition suggests that alcohol may affect the brain mechanisms which play a role in these functions. Such brain mechanisms seem to continue to have deficits even after three weeks without alcohol use. The findings in this study provide evidence that alcohol use by adolescents may cause damage to the developing brain. This highlights the importance for prevention and intervention for alcohol use by youths.

In addition to studies on the effects of alcohol on brain function, studies have also been conducted to examine the effects of alcohol on brain structure. Because brain development and maturation occur during adolescence, an alcohol use disorder may affect adolescents and adults differently. De Bellis et al. (2000) studied the hippocampus and amygdala and also compared additional areas of the brain in adolescents and young adults who had an alcohol use disorder which began in adolescence. They then compared these brain structures to “matched healthy comparison subjects.” The participants in the program consisted of 12 participants with an alcohol use disorder which began in adolescence. The mean age of these particular participants was 17.2 years. Of these participants, five were male and seven were female. Seven of these participants had lifetime alcohol dependence and five had alcohol abuse. These diagnoses of substance use disorders were based on *DSM-IV* criteria and information was obtained via direct interviews about the use of drugs and alcohol. The average age of onset for an AUD was 15.9 years. In addition to substance use disorders, participants were also evaluated for Axis I mental disorders. Comorbid conditions in some of the participants with alcohol use disorders (AUDs) included other substance abuse or dependence, major depressive disorder (MDD), conduct disorder (CD), attention deficit hyperactivity disorder (ADHD), oppositional defiant disorder (ODD), generalized anxiety disorder (GAD), post traumatic stress disorder (PTSD), and bipolar disorder. Of the individuals in the AUD group, nine had a history of cannabis use, two had used hallucinogens, nine had MDD, and five had a history of CD. Furthermore, five of the AUD participants had a history of PTSD, five had ADHD, two had ODD, two had GAD, and one had a history of Bipolar disorder (De Bellis et al.). The average age of cannabis use was 15.3 years, and of the nine users, seven of them had an AUD prior to the cannabis use problem. The comparison subjects consisted of 24 healthy subjects with no history of psychiatric disorders



including alcohol or substance use disorders. Ten of these healthy comparison subjects were male and 14 were female. The mean age among healthy participants was 17.0 years. Each AUD participant was compared with two healthy comparison subjects due to the high amount of variability in the volume of structures in the brain. The subjects were similar in age, sex, handedness, height, weight, socioeconomic status (SES), and “full-scale IQ”. Individuals were excluded from the study if they had used alcohol or drugs within two weeks before the Magnetic Resonance Imaging (MRI) scan, which was determined with a urine drug screen and an alcohol breathalyzer test within 12 hours of the MRI. Individuals were also excluded if they had a significant medical or neurological illness, were grossly obese, had growth failure, had a full-scale IQ < 80, were pregnant, or were unable to consent due to poor English skills. Written consent was obtained from the participants or from the parents if necessary, and the participants were compensated. The MRI studies were all obtained at the same location and verified via specific methods. All images and measurements were obtained using the same detailed procedure. The images were analyzed using “IMAGE” software by trained, reliable raters who were blind to the information about the participants. Specific methods were used for image analysis to obtain the following: intracranial volume, cerebral volume, total cerebral gray and white matter volumes, measurement of hippocampal formation (included cornu ammonis, dentate gyrus, and subiculum), right and left lateral ventricle measurements, and the corpus callosum was identified and divided into seven different regions. Statistical analysis was then performed.

The adolescent hippocampus seems to be especially vulnerable to alcohol (De Bellis et al., 2000). Individuals with a history of an AUD were found to have smaller right and left hippocampal volumes than healthy comparison subjects ( $p = .01$ ). After adjusting for

intracranial volume, gender, and interactions between group and gender, these areas remained smaller ( $p < .02$ ). No differences were found in the intracranial volume, cerebral volume, cortical gray and white matter, right and left amygdala volumes, or the corpus callosum region between the two groups of participants. Individuals with an alcohol use disorder and PTSD had hippocampal volumes which were significantly less than other subjects ( $p = .05$ ). Although individuals with an AUD but without PTSD seemed to have lower hippocampal volumes as well, this difference was not significant ( $p < .06$ ). After adjusting for intracranial volumes, a positive correlation existed between the age in which the AUD began and the “total hippocampal volume” ( $p = .004$ ). There was a negative correlation with the number of years in which the participant had the AUD ( $p < .007$ ). There was no significant association between the adjusted hippocampal volume and the quantity of alcohol consumed in the 30 days prior to the study ( $p = .14$ ), age of AUD onset ( $p = .13$ ), or duration of the comorbid marijuana use disorder ( $p = .69$ ). There was a larger intracranial volume in males compared to females ( $p = .005$ ) but there were no significant “sex-by-group” effects. It is possible that adolescents who stop drinking alcohol may be able to recover function, unlike adults, since adolescents are still developing (De Bellis et al., 2000).

#### *Risk Factors for a Future Alcohol Use Disorder*

The age at which drinking is initiated predicts the future risk of alcohol abuse and dependence. Grant and Dawson (1997) conducted a survey to evaluate the relationship between age at which alcohol use is initiated and the incidence of alcohol abuse and dependence later in life. This survey featured a multistage design and oversampled blacks and individuals 18 to 29 years old. The “National Longitudinal Alcohol Epidemiologic Survey” (NLAES) sample

population contained 27,616 current or former drinkers who accounted for 66 percent of the total sample population. Of these individuals reporting use of alcohol, 18,352 admitted to being current drinkers, while 9,264 reported themselves as former drinkers. Of the alcohol users, 51 percent were male and 88.9 percent were nonblack. They used the “Alcohol Use Disorders and Associated Disabilities Interview Schedule” (AUDADIS) to assess the presence or absence of alcohol use disorders. The participants were labeled with a lifetime alcohol use disorder if they had experienced either alcohol abuse or dependence in the last year or prior to the last year. The participants were asked how old they were when they began drinking, excluding sips or tastes. The researchers determined the presence or absence of a family history by asking questions about the participants’ biological relatives to determine how many relatives were alcoholics or problematic drinkers. If any first- or second-degree relatives were alcoholics or problematic drinkers, the participant was labeled with a positive family history. The data were analyzed to determine the occurrence of alcohol dependence and abuse based on age at which drinking was initiated, as well as by gender and race.

The results of the Grant and Dawson (1997) study demonstrate that the age at which drinking is initiated predicts the future risk of alcohol abuse and dependence. Future alcohol use disorders were shown to be inversely related to age at which drinking began. Specifically, the occurrences of both alcohol dependence and abuse were shown to decrease as the age of first drink increased. Of the participants who began to use alcohol before age 15, 40 percent suffered from alcohol dependence later in life. Similarly, individuals who began drinking at the age of 14 had the highest rates of later alcohol abuse. The second analysis, which evaluated the role of age at first drink and its effect on alcohol use disorders found similar results after controlling and adjusting for the differences in participants. Fourteen and eight percent decreases in the chances

of developing alcohol dependence and abuse, respectively were associated with each year later that participants began to use alcohol. However, the results showed an increase in alcohol dependence when drinking began at ages 23 and 24 as compared to age 22. Gender and race did not seem to affect any trends seen in the results.

The Grant and Dawson (1997) study was followed by a similar study in 2001 by Grant, Stinson, and Harford. These researchers also investigated the prevalence of alcohol abuse and dependence. They surveyed their study population at seven and 12 years after the participants began using alcohol. The survey began in 1979 with 12,686 males and females who were 14 through 21 years old. The researchers used a total of 5,792 of these individuals in their analyses. In 1982, the researchers asked the participants when they began drinking at least two drinks per week to determine the age at which they began drinking. Then, in 1989 and 1994, the participants were evaluated for alcohol abuse and dependence based on questions that measured *DSM-IV* criteria for these diagnoses. The results revealed that the occurrence of alcohol abuse was 12.2 percent in 1989 (when the participants were 24 to 31 years old) and ten percent in 1994 (participants were 29 to 36 years old), while alcohol dependence was seen in 4.7 percent in 1989 and 4.3 percent in 1994 (Grant et al., 2001). Additionally, the results showed a trend in which alcohol use disorders were less common as age of first alcohol use increased. Also of note, in 1989, for each year later that the participants began to use alcohol, alcohol dependence decreased by five percent. However, in 1989, alcohol abuse was not found to be affected by the age at which drinking began. In 1994, rates of both alcohol abuse and dependence were found to decrease as age at initiation of alcohol use increased. In 1994, the prevalence of alcohol dependence and abuse decreased by nine and seven percent, respectively for each year later that drinking began. These findings support those of Grant and Dawson (1997) in which alcohol use

disorders are more common in individuals who began drinking at a young age. Additional factors associated with an increase in alcohol abuse and dependence included being a younger age, being black, being unmarried, separated or divorced, use of marijuana, family history of alcoholism, and participation in antisocial behaviors. Individuals who were high school dropouts had a higher prevalence of alcohol dependence, while children of a high school dropout were at an increased risk of developing alcohol abuse. The study by Grant et al. supports the idea that early onset of alcohol use is an important predictor of future alcohol abuse and dependence. As a result of this relationship, a Healthy People 2010 objective is aimed at delaying use of alcohol among adolescents.

Many factors play a role in the first use of alcohol and the later development of alcohol use disorders. Sartor et al. (2007) conducted a study to determine childhood risk factors that play a role in the age at which individuals first begin to use alcohol and also the time elapsed until alcohol dependence occurs. The researchers recruited participants by using the Vietnam Era Twin (VET) registry. The offspring of these male twins were the main focus of this study. The researchers selected a group of male twin pairs in which at least one of the twins was determined to meet criteria, via phone interview, for lifetime alcohol dependence. The comparison group was a random sample of male twin pairs who did not meet the criteria for alcohol dependence. Furthermore, at least one of the males of the twin pair was required to have at least one child born from 1974 to 1988, and some of these men had up to three children that were participants in this study. Interviews were conducted on 1,352 of these children. The offspring of the twin pairs were divided into four groups (highest to lowest risks) with varying levels of both genetic and environmental risks. The group in which the offspring were placed was based on the presence or absence of alcohol dependence (AD) in the child's father and his father's twin. The

ages of the offspring spanned from 12 through 28, with an average age of 20.10 years. Male offspring accounted for 48.5 percent of the participants while 51.5 percent of the offspring were females. Ninety-five percent of the participants were described as non-Hispanic white.

The study used “computer assisted phone interviews” to collect data (Sartor et al., 2007). The researchers determined the presence or absence of psychiatric disorders in the offspring through the “Semi-Structured Assessment for the Genetics of Alcoholism” (SSAGA-II). They also used this interview to determine the participants’ detailed past histories of many disorders including mood and anxiety disorders, conduct problems, childhood sexual and/or physical abuse, and past substance abuse. Additionally, the mothers gave information regarding the diagnosis of ADHD in their sons. The researchers obtained information about the participants’ fathers including details about their psychological conditions and their demographics. The participants’ mothers were assessed for history of alcohol use disorders and major depression, and they were tested for drug use, nicotine dependence, mania, and antisocial personality disorders. Sartor et al. defined the age of first drink as the age at which the individual consumed his or her first whole standard drink (can of beer, shot, glass of wine, etc.). The age of onset of alcohol dependence was determined by the age at which *DSM-IV* criteria for AD were first met. The researchers documented known risk factors for initiating drinking at a young age and for the later development of AD. These risk factors include parental psychiatric problems, parents with problems involving substance use, child abuse, parental divorce, misuse of substances by the participant, psychiatric disorders of the participant, and residing in a high risk neighborhood.

The research by Sartor et al. (2007) provides important information regarding both psychosocial and also psychiatric factors and the roles they play in onset of drinking and later AD. The results demonstrated that 79 percent of all the offspring (both those at high and low

risk) interviewed in this study admitted to consuming alcohol. The average age of drinking onset was found to be 15.72 years of age. The highest risk factor for early use of alcohol was a diagnosis of conduct disorder, as these individuals began using alcohol 2.5 times faster than those individuals without conduct disorder. Other factors found to increase the risk for early initiation of alcohol use included ADHD, a mother with AD, male gender, family history of AD, and parental divorce. However, divorce during the 13 to 15 year old age group was found to have less of a risk. Of all the individuals who reported alcohol consumption prior to the study, 13.2 percent developed AD. The average age at which diagnostic criteria for AD were met was 19.12 years. Individuals who began consuming alcohol at an earlier age were more likely to develop AD than those who began to use alcohol at a later age. However, participants who began drinking at a later age developed AD more quickly. The only risk factor found for both early onset of alcohol use and also development of AD was conduct disorder. The additional risk factors found to predict the time from first drink to AD were use of marijuana, nicotine dependence, which increased the risk by 3.91 times, and also generalized anxiety disorder, which increased the risk by 3.5 times. The authors have suggested that both the “developmental period of risk” and the years of exposure to alcohol play different roles. This is due to the findings that the individuals who began drinking at an earlier age had an increased chance of developing alcohol dependence (AD). However, they developed AD more slowly than those participants who began drinking later on. These findings can be used in the development of prevention and treatment interventions.

*Children of Alcoholics*

Family history of alcohol dependence may be a powerful predictor of one's risk of developing an AUD. Schuckit and Smith (2001) began studying alcoholism in the mid 1970s in males who had a father with alcohol dependence. When feasible, the researchers obtained information on those children of alcoholics (COAs) who had additional family members with alcoholism. These participants were identified as having a family history positive (FHP) for alcoholism and were therefore at higher risk than the general population for an AUD. The researchers made exclusions to control for numerous factors related to AUDs. They did not include Asians in the study because this population possesses an enzyme that breaks alcohol down to higher than usual amounts of acetaldehyde, which is a protective factor against developing alcoholism since it causes adverse effects. Schuckit and Smith also excluded those individuals with antisocial personality disorder in either the father or the son, and they also avoided studying individuals with a personal or family history of schizophrenia or bipolar disorder. In addition to the risk factor of family history, participants were tested at approximately 20 years of age to determine whether or not they had a low level of response to alcohol. Level of response (LR) is determined by one's genetics, and those individuals with a low LR are at an increased risk of developing an AUD, as the authors found in a previous investigation. The presence or absence of low LR was determined with an alcohol challenge test, and the authors used z-scores to standardize the data. Face-to-face interviews were conducted on the participants at baseline, ten, and 15 years. At baseline, the participants were asked about alcohol use, drug use, and related factors. The follow-up interviews were used to assess alcohol abuse, alcohol dependence, other substance use disorders, mood, anxiety, and other psychiatric disorders during this study. At 15 years after baseline, the spouses were also



interviewed regarding family history, substance use and problems, and also their own history of psychiatric disorders.

The multifaceted nature of alcohol use disorders makes it possible for some individuals with a low risk of developing an AUD to develop such a disorder. This also allows some individuals with a very high risk to avoid development of an AUD. Schuckit and Smith (2001) focused on the “unexpected outcomes” meaning that although at a higher risk of developing an AUD, the individual did not, or although at low risk, the individual did develop an AUD. The participants were 411 men from the San Diego Prospective Study. The average age of the 411 males was 36.6 years. The researchers gathered many types of information on these participants including “behavioral undercontrol,” stress coping mechanisms, their general feelings about alcohol, the amount of nurture in their social support systems, the amount of drinking they were typically exposed to, and their life stress over the 15 years. The participants were divided into three different groups. The first group included 98 men (23.8%) with a family history negative (FHN) for alcoholism and with a LR that was greater than one-third. The second group contained 217 men (52.8%) who had one of the risk factors, but not both, and the third group consisted of 96 men (23.4%) who had both FHP and also low LR.

A statistically significant increase in AUDs ( $p < .0001$ ) was seen across the three groups over the 15 year period (Schuckit & Smith, 2001). From baseline to the 15<sup>th</sup> year for follow-up, 21.4%, 35.5%, and 60% of the individuals in groups one, two, and three, respectively developed an AUD. The researchers studied the development of alcohol dependence and abuse separately. More specifically, in group one, 17.3 percent of the participants developed alcohol abuse and 4.1 percent developed alcohol dependence. In group two, 16.6 and 18.9 percent of the participants developed alcohol abuse and alcohol dependence, respectively. In group three, 31.9 percent of

the subjects developed alcohol abuse, while 28.1 percent developed alcohol dependence. Overall, all the groups were significantly different regarding alcohol dependence ( $p < .0001$ ). Group one and two significantly differed ( $p < .001$ ), group one versus three were different ( $p < .0001$ ), and groups two and three were significantly different ( $p < .004$ ). Regarding abuse, there was an overall significant difference ( $p < .001$ ), and there was significant difference between groups one and three ( $p < .001$ ) and two versus three ( $p < .001$ ), but not between groups one and two ( $p = .65$ ).

The researchers evaluated individual characteristics of the participants to determine risk factors for development of an AUD. In two of the three groups, baseline factors that were associated with an increased risk for an AUD included number of drinks consumed per drinking day, number of problems in their lifetime resulting from alcohol use, consumption of alcohol more often, and low affiliation with church. Higher “positive alcohol expectancies” were associated with an increased risk of an AUD in all three groups, but was only significant in groups one ( $p < .02$ ) and three ( $p < .001$ ). In group two, poor coping skills, exposure to increased amounts of drinking in the environment, and less nurture from the social support system were associated with an increased risk of developing an AUD. Finally, poor control of behavior and decreased nurture were associated with AUDs in group three. The authors analyzed the items with significant differences between groups one and three comparing those individuals with and without AUDs. The results demonstrated that even when the other risk factors were controlled, higher quantity and more frequent consumption of alcohol increased the risk of AUDs. An additional finding suggested that those individuals with a low LR and FHN who developed an AUD only seemed to be significantly affected by their baseline patterns of alcohol consumption (Schuckit & Smith, 2001). In contrast, in those individuals without a low LR but FHP who

developed an AUD, more factors were found to play a role. Quantity and frequency of drinking, religion, and three more areas assessed at year 15 were related to the development of these individuals' AUDs. This suggests that those with a low LR and FHN would be less likely to benefit from interventions since fewer factors were related to AUD development in these individuals. Similarly, it suggests that those without low LR and FHP would be more likely to benefit from interventions aimed toward decreasing drinking, encouraging church-related activity, and increasing nurture in their social support systems. These findings are important because they can aid in the development of successful intervention programs for individuals who have a normal level of response and a positive family history. Personal or family history of major depressive episodes and higher stress levels were not found to be significantly related to alcoholism in this study (Schuckit & Smith, 2001).

The findings of this study may provide necessary information needed for programs which aim to prevent future AUDs. The authors report that the results for development of alcohol abuse demonstrate the importance of working with young teens to change their positive alcohol expectations and to work to keep the "quantity and frequency" of alcohol use as low as possible. For alcohol dependence, the authors indicate the three most important areas which accounted for 36 percent of the variance and therefore suggest that prevention be aimed at these three areas. First, individuals should steer clear of a pattern of alcohol-related problems. The second goal is to decrease positive alcohol expectancies, and the third intervention should help with coping mechanisms needed in difficult situations.

There may be a phenomenon in which individuals tend to decrease their drinking as they approach the increased responsibilities of adulthood. Jackson, Sher, Gotham, and Wood (2001) conducted a longitudinal study on the transition from larger amounts of drinking, typically in

college-aged individuals, to smaller amounts of alcohol consumption in early adulthood. The two main factors the authors studied were family history of alcohol use disorders (AUDs) and gender, which have both been shown to play a vast role in the development of alcohol use disorders. These factors have been associated with an increased amount of drinking early in life, and they can influence “persistence of, progression to, or regression from” excessive alcohol consumption throughout young adulthood. These two risk factors are a different type of risk factors that can hinder one’s chances of transitioning out of excessive drinking to less drinking. To measure the amount of alcohol consumption, the researchers used a subjective approach that asked the participants about the “effect” they experienced as a result of alcohol use instead of asking about the amount they drank and how often they drank. They chose this method to control for the difference in metabolism, body mass, and tolerance among different individuals. Those who did not drink were recorded as abstainers. Latent transition analyses were used to show changes regarding gender and family history in the transitions in alcohol consumption. One area in which the researchers were interested, was the transition out of heavy drinking in college. There were a total of 443 participants; 47 percent were males and 51 percent had a family history of alcoholism. This prospective study included data from three of five evaluations over a period of seven years. The first evaluation was collected during the participants’ freshman year of college (average age 18.5 years), the second was at age 21, and the third was at an average age of 24 years old. The evaluations consisted of a paper and pencil questionnaire in which the participants were asked about gender, use of alcohol, and also many additional factors. The researchers also followed up with those individuals who dropped out of college. The questionnaire determined how often the participants used alcohol in the last month, and this was converted to number of drinks per week. The survey asked how often the individuals had

consumed alcoholic beverages, how often they felt “high or lightheaded,” and how often they “felt drunk”. Based on this information, the participants were divided into four groups: abstainers (14 percent at year one), “limited-effect” drinkers (eight percent), “moderate-effect” drinkers (23 percent), and “large-effect” drinkers (54 percent). The limited-effect drinkers were described as those who were likely to drink but had a low chance of becoming high or drunk. The moderate-effect drinkers were likely to drink and get high but unlikely to get drunk. Finally, the large-effect drinkers were very likely to drink, get high, and get drunk.

The trends of alcohol use across an age span enable the prediction of an individual’s alcohol use over time. The data showed trends in which the amount of people in the large-effect drinking group decreased over time, which suggests a “maturing out” of heavy drinking into the moderate- and limited-effect drinking groups. The abstaining participants remained “stable” over the study, and more participants decreased their drinking to a lower effect of drinking than increased to a higher level of drinking over the seven years of the study. These transitions happened over important points in young adulthood when most people’s lives change drastically as they are getting jobs, marrying, and preparing to become parents (ages 18-24). Although there was a trend in which drinking decreased in this study, 40-70 of patients remained constant in their alcohol consumption levels (Jackson et al., 2001). These results report that all individuals do not “mature out” of their drinking. Additionally, some participants actually increased their drinking over the study. However, more participants transitioned into a lower drinking level than increased to a higher level. The researchers believe that the increase in drinking may be related to the fact that individuals reached their legal age to consume alcohol or could be a result of “pathological” drinking. Importantly, this study revealed that individuals with a family history of alcoholism were less likely to transition to a lower level of drinking than those without a

family history. However, family history was not found to be associated with level of drinking at the beginning of the study. Therefore, the results of this study suggest that family history plays a larger role in the development of “problematic acceleration involvement” in young adults than in the initiation of drinking. The data from this study also show that those with a positive family history versus those with a negative family history differed in the categories of alcohol problems and alcohol dependence but not on the amount and frequency of alcohol use. The data suggest more of a relationship in the “correlates of consumption and problem indicators” than is typically described. The authors suggest that this could be associated with the subjective approach to measurement and that this approach should be considered more often.

To alter the course of development of AUDs, the researchers suggest focusing on the “self-regulatory processes” and environmental influences which seem to play a role in excessive alcohol use rather than focusing on the factors that are related to initiation of drinking. Upon comparison of males and females, women were less likely to be in the higher level drinking groups than men, and females were also more likely to transition to a lower drinking category than men (Jackson et al., 2001). Women tend to transition out of drinking sooner than men do. The authors indicate how the findings from this study can aid in preventive interventions. In the participants’ freshman year of college, 54 percent were in the category of large-effect drinkers. Many of these individuals remained in this category throughout the study. This suggests that prevention should be initiated early - at least before college entrance. Also, prevention may be helpful in the beginning of college. Males with a family history of alcohol use disorders and those who consumed alcohol excessively with the greatest effects were the most likely to continue high levels of consumption and also develop alcohol dependence. Therefore, these individuals could be a main target for prevention. The authors report that it would be

advantageous if these individuals could be targeted to begin intervention prior to college entrance, but if not, intervention should still be attempted. The current study had a retention rate of greater than 90 percent.

Children whose parents struggle with alcohol use disorders may be at an increased risk for similar future difficulties. Lieb et al. (2002) conducted a study on the relationship between parental alcohol use disorders and alcohol use in their offspring. This study used individuals from the community, versus those individuals seeking treatment. This was a prospective longitudinal study in which the baseline ages for participants were 14 to 24 years old. The group studied was a random sample from the 1994 government population registers of people living in and near Munich, Germany. A total of 2,427 participants completed the whole study. Of these participants, 48.5 percent were females and 51.5 percent were males. The baseline interview was conducted in 1995. The first follow-up was conducted approximately 20 months after baseline, for the individuals ages 14 to 15. The second follow-up was conducted at an average of 42 months after baseline on all participants. Additionally, the mothers were interviewed for individuals aged 14 to 17, and the fathers were interviewed only if the participant did not have a mother that could be contacted. Family history of alcohol use disorders (AUDs) was assessed at baseline and at the second follow-up for first degree relatives. The participants were asked questions at baseline to determine key symptoms, *DSM-IV* diagnoses, and family history. The second follow-up assessed *DSM-IV* criteria for a family history of nicotine dependence, major depression, manic episodes, anxiety disorders, and bulimic attacks. Participants reported information regarding their parents and siblings in addition to themselves, and parents of the youngest age group were interviewed to obtain more information regarding relatives, family history, and the developmental history of the participant. Based on the participants' information

reported at baseline and follow-up, they were classified as no use, occasional use, regular use, or hazardous use. Alcohol use disorders were defined according to the *DSM-IV*. The researchers determined the ages at which the participants first experienced alcohol abuse or dependence and also the age at which the greatest use of alcohol occurred in the peak period.

Upon evaluation of the data, it was revealed that children with parents who have an AUD are at an increased risk to develop an AUD themselves (Lieb et al., 2002). Children who had either parent with an AUD were at a higher risk to consume more alcohol during the teen years than their peers. While a mother with an AUD raised a child's risk to increase drinking from "occasional" to "regular" use, a father with an AUD increased the risk to transition from "regular" to "hazardous" consumption. The researchers hypothesized that this could be related to higher amounts of alcohol consumption at home by the fathers than by the mothers, therefore setting an example of excessive use for their children. While children with one parent with an AUD were at higher risk than their peers without a family history of alcoholism, children with both parents with an AUD were at an even higher risk of increased alcohol consumption patterns during their teen and early adult years. This suggests that AUDs in both parents is a key risk factor in the "escalation of alcohol use" in their children. Although children with both parents with AUDs were shown to be at an increased risk of increased consumption of alcohol, "parental concordance" was not found to be such an important risk factor in the development of alcohol abuse and dependence among the children.

When reviewing the data for the age at which alcohol consumption began, results from this study suggested that having one or both parents with an AUD increased the risk that such children will begin dangerous alcohol use and develop dependence at ages 14 through 17. Having both parents affected further increased this risk for "hazardous" alcohol use and also for



earlier development of an AUD (Lieb et al., 2002). These findings support the findings of the research studies described earlier which link early onset of alcohol use to increased risk of AUDs (Grant & Dawson, 1997; Grant et al., 2001). While daughters of a mother with an AUD were at a higher risk than sons to transition from “occasional” use to “hazardous” use of alcohol, this difference was not found to be significant (Lieb et al.). There were no significant gender effects found in this study, which suggests that parental AUDs had a similar effect on both sons and daughters of alcoholics.

### *School-Based Prevention/Intervention*

Although many different school-based substance prevention programs have been implemented, poor results have been obtained. Substance abuse among youth is consistently problematic, which is quite concerning (Shope, Copeland, Maharg, & Dielman, 1996). The study by Shope et al. (1996) focused on educating tenth grade students about alcohol misuse and ways to prevent this problem. The goal was to lower the typically increasing amount of alcohol use, misuse, and driving while intoxicated. This program taught the students techniques to refuse an offer of alcohol. The researchers implemented the tenth grade curriculum in nine different high schools in a total of four school districts. The researchers attempted to randomly assign the students to the control and curriculum groups, but based on the school, this was not always possible. Consent to participate in the study was obtained from the students’ parents, and the pretest was given to tenth-grade students in the fall. The curriculum began in the winter. Two months after this was completed, a post-test was given to the students. A second post-test was given two years later, when students were in the twelfth grade. Some of the tenth grade students had a prevention program in the sixth grade called “Alcohol Misuse Prevention Study”

(AMPS) curriculum. The tenth-grade curriculum attempted to enhance the AMPS curriculum. The curriculum was designed to teach students about the effects of alcohol use and the consequences and risks associated with the use of alcohol. The program also educated about alcohol misuse and the positions in which students may find themselves with pressure to misuse alcohol. Furthermore, the curriculum focused on skills to avoid peer pressure and placed the students into commonly encountered situations so they could practice these skills. A total of five 45 minute sessions were implemented by trained teachers. These sessions encouraged students to participate and used positive reinforcement for the students' participation.

The data for this study were collected via two methods. First, the students were instructed to complete confidential questionnaires comprised of questions related to the curriculum. Second, the students who were chosen for the mock alcohol refusal role play were rated by females. These were the only ratings used in the results because the female ratings were most consistent. These ratings were based on how real the refusal seemed, how convincing the student was, the student's eye contact, the voice of the student, and how well the raters believed the student would be able to refuse a real offer. In all, the sample consisted of data from 1,041 students. Of these, 531 students were in the control group and 510 were in the curriculum group and attended at least one session of the curriculum. However, 97.5% of students in the curriculum group participated in at least three of the sessions (Shope et al., 1996). The data on the mock trial measuring refusal skills included 641 participants, 327 of which were in the control group. The measures for this study included knowledge about avoiding or preventing the misuse of alcohol, the ability of students to refuse the offer of alcohol, and a self-report of alcohol consumption by the students. The self-report-collected information about how often the

students had used alcohol in the last year and how much they used each time. From this information, a value for number of drinks per week was derived.

This type of curriculum program can have positive results on high school students. A repeated measures ANOVA revealed that the knowledge score was increased by the curriculum ( $p < .001$ ). Post-hoc analyses revealed that the students in the curriculum scored higher on the post-tests than the control students in both tenth grade ( $p < .001$ ) and twelfth grade ( $p < .027$ ) (Shope et al., 1996). The refusal skills of tenth graders were related to more knowledge about prevention of alcohol misuse ( $p < .001$ ) and to lower chances of misusing alcohol and driving after drinking ( $p < .05$ ). Refusal skills at grade twelve were associated with more knowledge about alcohol misuse ( $p < .05$ ) but also with driving after alcohol consumption ( $p < .05$ ). At both tenth and twelfth grades, refusal skills fell short of a significant negative correlation with alcohol consumption ( $p < .07$ ). No significant effect was seen for the sixth grade program on refusal skills, but females did exhibit better refusal skills than males in this study ( $p < .001$ ). No effect of the sixth-grade program was seen on high school alcohol use. Upon comparison of students in the control and curriculum groups at the twelfth-grade post-test, individuals in the control group had higher amounts of alcohol misuse than individuals in the curriculum group ( $p < .043$ ). The sixth-grade curriculum showed encouraging results over time with alcohol misuse ( $p < .003$ ). Driving after drinking seemed to continue despite the curriculum ( $p < .120$ ), but the sixth-grade curriculum did seem to have a positive effect on this ( $p < .021$ ). Overall, this study suggests that a high school curriculum can influence both knowledge and actions of high school students both immediately following the curriculum's implementation and also two years after the program. The curriculum increased knowledge about alcohol misuse prevention and also decreased the typically increasing rates of alcohol misuse. Although the effects were small, they show promise

for future efforts. Furthermore, although the sixth- and tenth-grade curriculums were not shown to produce a greater combined effect, this study does suggest that a high school program, alone, can produce desirable outcomes. Thorough programs and strategies in schools, communities, and families to help set good examples for our youth and cut down on the widespread use of alcohol are needed.

Many school programs are used in an effort to decrease or prevent substance use. A Substance Abuse and Mental Health Services Administration (SAMHSA) model program named *keepin' it REAL* is one such program. This is a curriculum designed to prevent substance use by teaching refusal skills. *REAL* stands for the following: Refuse; Explain; Avoid; Leave. This program is described as a “culturally grounded” classroom curriculum consisting of ten sessions. The goal of this curriculum is to “enhance anti-drug norms and attitudes” and to teach students to recognize risks, make wise decisions, and to teach refusal skills to participants. This program was previously shown to be successful in a randomized trial, but that trial did not examine the effects of the curriculum on current users versus non-users. Although this curriculum was not designed to reduce or discontinue current use of substances, the researchers here suggest that the resistance skills taught by the program may enable current users to resist future use (Kulis, Nieri, Yabiku, Stromwall, & Marsiglia, 2007).

The study was conducted in four waves over a two year period. The researchers included 35 schools in a large southwestern city. Based on the number of students in the schools and on the percentage of Latino students in the schools, the schools were assigned to either program (treatment) group or control group via block randomization. The program group of schools administered the *keepin' it REAL* program, while the control schools continued to administer their normal prevention programs. Prior to the study, parents were informed via a letter and

asked for permission for their children to participate. A pre-test survey was administered in the schools. This consisted of a 45-minute written questionnaire, available in both English and Spanish, given during school. Students were told that it was a voluntary research project and that their responses were confidential. Of the students who participated in the pre-test survey, 1,364 students reported use of alcohol, marijuana, or cigarettes at least once within the past 30 days. This current study is based only upon those students who reported substance use. Following the pre-test survey, the *keepin' it REAL* program was administered. Data was then collected in Spring 2000, Fall 2000, and Spring 2001. The sample consisted of mostly seventh graders and approximately 100 eighth graders. The participants were 43% female, 57% male, 77% Latino, 13% White or Anglo, and 47% were Spanish language dominant. The mean age for the participants was 13 years, and the majority of the participants came from low-income families. There were many measures in this study. Recently reduced use was defined as a “transition from more to less” use in the last 30 days, based on number of days of use. Recently discontinued use was defined as a “transition from use to non-use” for a total of 30 days with no use. Alcohol use, marijuana use, and cigarette use were all measured separately. Time to recent reduction or discontinuation was also measured, as was program participation (77 percent of participants) versus control (23 percent). Substance use severity was based on the reported frequency of use from the questionnaire. It was measured on a six-point Likert scale based on number of days in the past 30 days in which the individual used substances. This was determined for alcohol, marijuana, and cigarettes. The final measures included ethnicity and control variables such as language, age, school performance, and socioeconomic status (SES).

The analysis of the data suggested that the curriculum may help decrease or discontinue substance use among adolescents. The *keepin' it REAL* program had a positive influence on

recent decreases and discontinuations of alcohol and also of recent discontinuation of all substance use. Of the 1,028 adolescents who had reported recent use of alcohol prior to the curriculum, 40 percent reduced alcohol use and 32 percent had recently discontinued alcohol use. These numbers were significantly higher in the program group than in the control group. The curriculum students' amount of reduced alcohol use was higher than the control group by 13 percent ( $p < .001$ ) and discontinued use was higher in the treatment group than the control group by ten percent ( $p < .01$ ) (Kulis et al., 2007). Although marijuana and cigarette use had overall reduced and discontinued use among previous users, there was no significant difference between the program and control groups. Overall, for users of any substances, including use of more than one substance, 26 percent discontinued use of all substances. This amount was significantly higher in the program than in the control group by seven percent ( $p < .05$ ). Kaplan-Meier estimates were also determined. Individuals in the curriculum decreased their alcohol use at higher rates than controls. This difference was significant using both Log-Rank ( $p = .00$ ) and Wilcoxon ( $p = .00$ ) tests. There were similar findings for discontinued use on the Log-Rank ( $p = .01$ ) and Wilcoxon ( $p = .01$ ) tests. No significant differences were found for rates of marijuana and cigarette use. Upon analysis of the effects of the program on reduction of substance use, those in the curriculum had significantly higher rates of alcohol reduction ( $p < .05$ ). Rates of reduction were 72 percent higher for the curriculum group than the control group. Better school performance was also linked to higher alcohol reduction rates ( $p < .01$ ). Time also played a role, as rate of transition to decreased alcohol use was lower in wave three than in wave two ( $p < .05$ ). Although cigarette and marijuana use were also decreased after the study, no significant difference was found between the curriculum and control groups. Non-Latino whites had lower rates of reduced cigarette use than Latino students, and the only significant predictor of

decreased marijuana use was time. There was a greater decrease in the fourth wave than the second wave ( $p < .05$ ). Severity of substance use was not significantly related to reduction of substance use.

Recent discontinuation of substance use was affected differently than reduction of substance use by the curriculum program. Discontinued use of alcohol was 66 percent higher for individuals in the curriculum group than those in the control group ( $p = 0.056$ ). Older students and those students with more severe alcohol use were less likely to discontinue use of alcohol. Rates of discontinued alcohol use decreased by twenty percent with each year of increasing age ( $p < .05$ ). In contrast, higher grades in school were associated with higher rates of discontinued alcohol use ( $p < .05$ ) (Kulis et al., 2007). The curriculum was not a statistically significant predictor of recently discontinued use of marijuana and cigarettes. Higher severity of marijuana and cigarette use was associated with lower rates of recently discontinued use. Additionally, non-Latino white students were less likely to recently discontinue use of cigarettes than Latino students ( $p < .05$ ). Substance use severity did have a significant interaction with curriculum participation for recently discontinued alcohol use ( $p = .02$ ) but not for cigarette or marijuana use. This suggests that the program was less effective for heavy alcohol users than for less frequent alcohol users. The program was not found to be less effective over time, as significant differences were found across the different waves of the study for any substance use. The data were also analyzed to determine the effects of the program on simultaneous discontinuation of all substance use. The rate of recently discontinued use of all three substances was 61 percent higher for the treatment group than for the control group ( $p < .05$ ). Better performance in school was also significantly associated with higher rates of discontinued use of all substances ( $p < .05$ ). In contrast, heavier use and older students had significantly lower rates of recent discontinued

use of all substances ( $p < .01$ ). Finally, although the curriculum program was effective in discontinuing use of all substances, those individuals who used more than one substance were more resistant to change than users of a single substance. Of single substance users, 43 percent recently discontinued use, while only 20 percent of individuals using greater than one substance recently discontinued use.

The study by Kulis et al. suggests that school programs may help decrease alcohol use among adolescents (2007). The *keepin' it REAL* program had a positive effect on recently reduced and discontinued use of alcohol and also on the recently discontinued use of all substances. This effect did not seem to weaken over time. These effects are important as some school-based programs have actually been shown to increase substance use among adolescents. Additionally, because the *keepin' it REAL* program was successful in increasing recently discontinued use of all substances, it shows that the curriculum does not simply aid in decreasing or discontinuing use of alcohol by adolescents who then switch to use of other substances. While higher severity of use was more resistant to recently discontinued use of alcohol, this was not the case for recently reduced use of alcohol. The findings of this research demonstrate a large difference between the individuals who participated in the curriculum versus the control group in the recent decrease or discontinuation of alcohol use. The data illustrate the benefits of the *keepin' it REAL* program for adolescents who have been involved in alcohol use.

#### *Family-Based Prevention/Intervention*

Children in families with parents and family members who use alcohol and drugs are more likely to use these substances in the future (Nye, Zucker, & Fitzgerald, 1999). This is also true for individuals who typically see heavy alcohol use and an environment in which such use is



not seen as problematic or unhealthy. In fact, by the ages of three to five, developmental markers that indicate later problematic use of alcohol may already be present. As a result, early family-based intervention for high risk children is necessary. Such intervention should address parental alcoholism and the commonly associated negative parenting and marital discord as well as the behavior of the child. The study by Nye, Zucker, and Fitzgerald took such an approach. The researchers hypothesized that early intervention toward child behavior problems would result in fewer future problems with alcohol use and antisocial behavior among the children. Similar previous studies by the authors revealed that expectations of treatment, investment in treatment, and satisfaction of the intervention all were related to the final outcome of the intervention. The current study follows up on the findings of the previous study and looks more closely at the ways in which the treatment factors are interrelated. The researchers predicted that the features of the treatment, not the pretreatment characteristics, would have an effect on the results of the treatment.

In the Nye et al. (1999) study, the participants consisted of “intact” families with an alcoholic father who had been convicted for driving under the influence of alcohol and a son three to five years old. These families were involved in a program designed to reduce the risk of future alcohol problems in the children by concentrating on consistent, disciplinary parenting to encourage “prosocial” behavior and discourage conduct problems in the children. The study consisted of 29 families who successfully completed the treatment and 23 control families. All families were white, all fathers met alcoholism criteria, average paternal age was 32, maternal mean age was 29, average number of years married was 7.3, and average family income was \$27,000 per year. The main focus of the program was not treatment, but rather as a type of education designed to enhance parenting practices to avoid future behavioral problems in the

children. The program lasted for ten months, with approximately 28 sessions. The first part focused on appropriate techniques to manage the behavior of the children. The second part was used to reinforce the techniques learned in part one and also to deal with marital discord and additional family difficulties. Data were gathered following each of these parts and also six months after completion of the program. Both parents, as well as the therapist rated the occurrence of both positive and negative behaviors using the “Child Behavior Rating Scale.” Parenting was measured by the therapist and included interaction between the child and parent and also the disciplinary action (“authoritative parenting”) that the parents used. Treatment investment was assessed by the therapist, based on parental cooperation and also parental drive to comply and participate in the treatment program. Expectations of the program by the parents and therapist were assessed before the treatment program began and also at post-tests to determine whether they felt the program would continue to help the child. Treatment satisfaction was also measured.

Parental investment, expectations of parents and therapist, and satisfaction of parents and therapists are essential factors related to positive changes in both parenting and conduct of children (Nye et al., 1999). Overall, this study showed an increase in positive child behavior throughout the study ( $p < .001$ ). Similarly, negative behavior in the children decreased throughout the study ( $p < .001$ ). The greatest changes were seen from the beginning of the study through the end of part one, and these changes continued even after the completion of the treatment phases. In addition to this, the parenting became more authoritative over the study period ( $p < .001$ ), and authoritative parenting was shown to continue six months after the intervention program was completed. Overall, the intervention program increased positive child conduct ( $p < .001$ ), decreased negative child behavior ( $p < .001$ ), and increased authoritative

parenting ( $p < .001$ ). The question to be answered is whether or not the parenting changes predicted the changes in child behavior. Pretreatment parenting and child behavior were not significantly associated. However, at the end of phase one and also at the end of the program, authoritative parenting was associated with an increase in positive child behavior ( $p < .01$ ) and a decrease in negative child behavior ( $p < .001$ ). Authoritative parenting was also shown to decrease negative childhood behavior at the 6 month follow-up. Parental investment in the treatment program was associated with increased positive and decreased negative child behaviors. Similarly, parental investment in treatment predicted authoritative parenting at midpoint ( $p < .001$ ) and completion ( $p < .0001$ ) with pretreatment controlled. An increase in authoritative parenting was associated with increased satisfaction among parents and the therapist. Also, higher parental expectations of the treatment program were associated with greater levels of parental investment ( $p < .05$ ). Similarly, greater levels of satisfaction with the treatment program were related to greater parental investment in the program ( $p \leq .01$ ).

Nye et al. (1999) provide evidence that parental investment, expectations, and satisfaction during the treatment program are important in the success of the program. These factors increase the authority of parents and therefore increase positive child behaviors and decrease negative child behaviors in alcoholic families. Because these changes continued to be seen six months after completion of the intervention, this suggests that the program is capable of preventing future difficulties with conduct in the children later in life, regardless of the pretreatment characteristics. Because Caspi, Moffitt, Newman, and Silva (1996) found that negative behaviors seen in preschool aged children were associated with a two times greater chance of having alcohol dependence at age 21, this study suggests that by decreasing negative behaviors in these children, it may be possible to prevent future alcohol use disorders (Nye et al., 1999).

Additionally, Nye et al. (1999) offer evidence that family-focused intervention in alcoholic families who are motivated to participate can result in better parenting and more favorable child behavior, which may prevent future problems for the sons of alcoholics.

It may also be possible to decrease problematic behavior in children by simply working with their parents on decreasing alcohol use and increasing marital satisfaction (Kelley & Fals-Stewart, 2007). Without focusing on parenting or the children's behavior, the children's home environments may be improved. This is especially important since parents who are receiving treatment for alcoholism are often hesitant to allow their children to also receive treatment. This makes it difficult to provide intervention at an early age to aid in decreasing similar future problems in the children. Kelley and Fals-Stewart found that children of parents who received a family-based intervention for alcohol use showed an increased level of psychosocial function compared to children of parents who received only personal treatment. They wanted to determine whether or not developmental stage and baseline functioning in children would play a role in such changes in children's behavior. The authors compared preadolescent (8-12 years old) and adolescent (13-16 years old) individuals to investigate this relationship. The families consisted of heterosexual couples in which the father was entering outpatient treatment for an alcohol use disorder. The father had to meet alcohol abuse or dependence criteria, and the mother could not have a history of an alcohol use disorder in the past six months. The families were required to contain an adolescent and a preadolescent, and the children had to be the biological children of the parents. The "Child Behavior Checklist" was completed by parents to assess both internalizing and externalizing behaviors of children, and the "Teacher Report Form" was completed by the main teacher of the child at regular intervals. Substance use of the father was based on percentage of days abstinent (PDA). This was reported after treatment and then

every three months for a year. The “Dyadic Adjustment Scale” was used to determine the relationship satisfaction of the children’s parents. The parents took part in the “Learning Sobriety Together” (LST) program in which the men first completed a four week orientation and also weekly counseling sessions. This was followed by 12 weeks of the LST primary phase of treatment in which the parents took part in one weekly session of Behavioral Couples Therapy (BCT) and the men attended an additional weekly counseling session. The BCT sessions focused on abstinence from alcohol and other drugs, communication skills, and on increasing “positive behavioral exchanges between partners and shared activities.” During the final 20 sessions of the treatment program, the fathers went to a weekly session with their therapist for alcohol counseling. None of the sessions in this program included the topics of parenting or child behavior. This study and follow-up period consisted of a 17 month period.

The results of this study reveal promising evidence that treatment of parents can have positive effects on their preadolescent children. PDA for the fathers and DAS for the parents were higher at each assessment interval than they were at baseline (Kelley & Fals-Stewart, 2007). This suggests an improvement in general functioning for the parents. Upon examination of internalizing behavior scores determined by the mothers, the effects of PDA and DAS were not significant in the adolescent group. However, both were significant in the preadolescent group ( $p < .05$ ). Similar effects were seen for externalizing behaviors as adolescents were not significantly affected by PDA and DAS, but preadolescents were ( $p < .01$ ). Similar results were found for the assessments by the fathers and the teachers. Externalizing behavior of the adolescents showed no significant effects for PDA and DAS. Internalizing behaviors of the preadolescents were significantly affected by PDA and DAS ( $p < .01$ ).

Preadolescents are affected more than their adolescent siblings by the parents' functioning, including how much alcohol their fathers consumed and the couple's relationship satisfaction (Kelley & Fals-Stewart, 2007). Interpretation of the study results indicate that both internalizing and externalizing behaviors of preadolescents are affected by the levels of the parents' functioning, but the same is not true for adolescents. Pretreatment severity of behavior in the children does not seem to change these findings. In regard to internalizing behaviors, significant effects for preadolescents were only seen based on the mother's assessments. For externalizing behaviors, however, the association between parents' functioning and the preadolescents' adjustment was significant for both parents and the teacher. This was not the case for adolescents. The findings suggest adolescents are more resistant to change and that preadolescents may still be at a developmental age in which the home environment has more of an effect on their behavior than it does on their adolescent siblings.

The findings by Kelley and Fals-Stewart (2007) show that a change in the home environment resulting from decreased substance use by the father and increased marital satisfaction of the couple has a positive impact on the preadolescent. This means that the child's risks for future problems are able to be decreased without seeking out these high-risk children and treating them with therapy individually. While this seems to be the case for preadolescents, adolescents may require more individual intervention to decrease their conduct difficulties. Accordingly, this shows the importance of early intervention.

#### *Community-Based Prevention/Intervention*

Research has shown that the characteristics of a neighborhood may have an important effect on substance abuse by youth. Duncan, Duncan, & Strycker, (2002) conducted a study

involving many neighborhood characteristics. They examined the amount of poverty in the neighborhood, which was determined by data from the census; number of stores in the neighborhood which sold alcohol (number per 1,000 population); and the number of drug and alcohol arrests in the neighborhood according to police data (number per 1,000 population.) The researchers also determined the perception of both social cohesion and neighborhood problems by members of the neighborhood, both of which were determined via surveys and rated on a 5 point scale. These data were then averaged. Additionally, neighborhood demographics including ethnicity, gender, and age were obtained. The researchers conducted this study in 55 neighborhoods in an urban area in the Pacific Northwest. The information used in this study was obtained in the following way. Families in the neighborhoods were randomly selected to participate with use of Computer-Assisted Telephone Interviewing (CATI) system. Those with children ages nine, 11, or 13 and who were either White or African American were eligible for the study. Aside from the “target” child, all of the family members who were older than nine were able to take part in the study. Of all eligible families, 75 percent agreed to participate. After the telephone interviews, consent to participate was obtained face to face and a second home visit was scheduled so the surveys could be completed. Individuals 11 years of age and younger were interviewed instead of being asked to complete the survey. The final sample consisted of 1,182 residential members of the neighborhood. Of these individuals, 57% were female, 41% were African American, 59% were White, and 51% were children (ages 9 years or older). The average age for children was 11.9 years, and the mean adult age was 42.3 years. Each family was paid one hundred dollars for their participation, and if all the family members who met eligibility criteria participated, a bonus of twenty dollars was given. In addition, each child who participated was paid five dollars.

The results from this study by Duncan et al. (2002) indicate that “neighborhood influences” and “youth substance use patterns” are related. Those individuals in upper class neighborhoods felt as though there was more social cohesion than those individuals in areas of higher poverty. The number of stores which sold alcohol in a neighborhood was not found to be significantly related to the amount of social cohesion. In contrast, areas with higher poverty contained more stores which sold alcohol ( $p < .05$ ) which may exacerbate problems in less-fortunate neighborhoods. Higher poverty was associated with less social cohesion ( $p < .05$ ), and less social cohesion was associated with a higher perception of problems with youth substance abuse ( $p < .05$ ). Furthermore, neighborhoods in which more problems were perceived had more arrests due to youth drug and alcohol abuse ( $p < .05$ ). Overall, whites perceived greater social cohesion than blacks ( $p < .05$ ) and adults perceived greater social cohesion than children ( $p < .05$ ). Adults and females perceived more problems in the neighborhoods than children and males ( $p < .05$ ). There were, however more female than male adults ( $p < .05$ ) in the study and more whites than African Americans ( $p < .05$ ) in the study. Neighborhoods may be an important influence on young individuals. Social cohesion, demographics, and neighborhood characteristics play an important role and have the potential to affect problematic behaviors in youths. The results from this study suggest that higher amounts of social cohesion are associated with less perceived problems with substance abuse among youths.

Another way in which communities may play a role in youth substance use is on the level of availability of alcohol and enforcement of laws involving possession of alcohol by a minor. Increased enforcement of laws may be associated with decreased use of alcohol by adolescents. Dent, Grube, and Biglan (2005) examined this relationship. These researchers conducted a study using a random sample of a total of 93 schools located in 115 rural northwestern communities in



the United States. The researchers administered anonymous questionnaires to students in eleventh grade during the spring of 2001 and 2002. Parental notification took place four weeks prior to the administration of the survey. Of all the students who met criteria for the study, 79 percent of the students participated. The data for this study are based on a total of 16,694 surveys of eleventh grade students, of which 85 percent were white, non-Hispanic, and half were females. The researchers obtained information regarding demographics, well-being, risk factors and protective factors, alcohol use, sources of alcohol, and levels of availability and enforcement in the communities. Regarding alcohol use, the researchers determined both frequency and quantity of use, alcohol use at school, and driving or riding with a friend who had been using alcohol. All of these items were used in a “CDC Youth Risk Behavior Survey.” The sources from which adolescents obtained alcohol were divided into two groups: commercial and social. Commercial sources specifically included grocery store, 7-11, drug store, and gas station. Social sources included the following: friend under 21 years old, friend older than 21 years, home, and parent. The community levels assessed the index of availability of alcohol in the community and the level of enforcement of minor in possession (MIP) laws. The data were analyzed using a multilevel approach which determined the level of access to individual and community sources of alcohol for youths.

The level of access to alcohol in a community and the level of enforcement of MIP laws play an important role in the use of alcohol by adolescents. In the communities studied, 30 percent of alcohol was obtained through a commercial source while 70 percent of alcohol used by adolescents was acquired through a social source (Dent et al., 2005). Friends over the age of 21 were found to be the most commonly used source of alcohol for adolescent alcohol use except for use of alcohol at school ( $p < .01$ ). The second most common source from which teens

obtained alcohol was peers under the age of 21 years ( $p < .01$ ). Parental sources of alcohol were related to an increased frequency of use among minors ( $p < .01$ ) but were negatively associated with binge drinking ( $p < .01$ ) and driving under the influence of alcohol ( $p < .01$ ). Students who used alcohol at school seemed to steal the substance from home ( $p < .01$ ). Commercial sources of alcohol were significantly linked to all outcomes, which included frequency of use, quantity used, use at school, and driving while under the influence of alcohol ( $p < .01$ ). Across the communities studied, increased commercial availability of alcohol was significantly related to both more alcohol use by youth and community problems ( $p < .05$ ). In communities with higher levels of enforcement of MIP laws, however, there were significantly lower levels of alcohol use ( $< .05$ ) and nearly significantly lower levels of binge drinking ( $p < .10$ ). Stricter enforcement of MIP laws seemed to deter use of commercial sources for alcohol use at school, ( $p < .01$ ) driving under the influence, (DUI) ( $p < .01$ ) use of a friend less than 21 years old for binge drinking, ( $p < .01$ ) general use of alcohol ( $p < .10$ ) and use of parental sources of alcohol for driving while intoxicated ( $p < .01$ ). Higher MIP enforcement, however, was also found to increase theft of alcohol from home for binge drinking, ( $p < .10$ ) general use of alcohol by minors, ( $p < .01$ ) and more frequent use of a friend 21 years or older as a source of alcohol for DUI ( $p < .01$ ). Enforcement was not found to be associated with use of alcohol while at school or driving while intoxicated. As commercial access to alcohol increased for adolescents, such sources were more commonly used for general alcohol use and also binge drinking ( $p < .01$ ). However, these sources were less commonly used for alcohol use at school ( $p < .01$ ) and driving while intoxicated ( $p < .01$ ).

The results of this study suggest that community-level characteristics may play an important role in youth alcohol use. These results clearly demonstrate the need for increased

control of alcohol access to youths and also for increased enforcement of minor in possession laws at the community level. As commercial access of alcohol to youths increased in the communities, youth rates of use increased, and problems related to alcohol use in the communities also increased. More efforts to decrease commercial access to alcohol by adolescents may benefit both health officials and also law enforcement because this would directly decrease problems related to alcohol use in the communities (Dent et al., 2005). These efforts should include education of the businesses and also “surveillance programs.” If negative consequences are enforced, teens would have to weigh the risks and benefits of alcohol use. Perhaps if the negative consequences were enforced, adolescents would be deterred from using alcohol.

## Discussion

Alcohol use, abuse, and dependence are very common in the United States and are associated with numerous adverse effects. Interventions focusing on prevention of alcohol use in adolescents may decrease the number of alcohol use disorders, and therefore adverse effects, experienced later in life. What are the risk factors for developing an alcohol use disorder, and what methods of prevention are successful in these at-risk individuals?

### *Consequences of Alcohol Use in Preadolescence and Adolescence*

The neurotoxic effects of alcohol may influence adolescents differently than adults because the brain is still developing during this period. A history of alcohol dependence in adolescence is associated with deficits in memory, visuospatial cognition, and also verbal skills, even after a period of sobriety (Brown, Tapert, Granholm, & Delis, 2000). Furthermore, the adolescent hippocampus is especially vulnerable to alcohol use. De Bellis et al. (2000) found that individuals with an AUD in adolescence had smaller hippocampal volumes than comparison healthy peers. Because the total volume of the hippocampus was positively correlated to the age at onset and also the duration of an AUD, it may be possible that adolescents are more susceptible to hippocampal toxicity resulting from alcohol use. Further studies are necessary to understand this relationship. Small groups and effect sizes and also comorbidities in the AUD participants may play a role in the findings. However, it is possible that adolescents who stop drinking alcohol may be able to recover function, unlike adults, since adolescents are still developing.

These studies provide evidence that alcohol use in adolescence does not only influence decision making and behavior, but also affects the development of the brain. In addition to

developmental disturbance, alcohol use and alcoholism may result in numerous accidents and health problems, both acute and chronic. These account for many unnecessary health problems and healthcare expenses. If alcohol use among adolescents can be prevented, these consequences may be avoided. If alcohol is already being used in adolescence, it is possible that intervention may limit the amount of damage that is done. These ideas emphasize the importance for prevention and intervention for alcohol use among youths.

### *Risk Factors for a Future Alcohol Use Disorder*

Many risk factors for a future AUD have been identified. Both genetics and lifestyle play a role in the development of alcoholism. A family history of alcoholism, antisocial behaviors, and drug use are associated with an increase in alcohol abuse and dependence. Additionally, being unmarried, black, separated or divorced, and being a high school dropout also increase the risk of a future AUD. It has been demonstrated that the age at which an individual begins to use alcohol may be a very important predictor of a future AUD. Those who begin drinking at age 16 or younger appear to have the highest risk to develop an alcohol use disorder. Factors which increase one's risk to begin alcohol use at a younger age include parental psychiatric problems, parents with drug or alcohol problems, parental divorce, child abuse, psychiatric disorders, residing in a high risk neighborhood, conduct disorder, male gender, family history of alcohol dependence, and ADHD.

While these findings seem to suggest that prevention of alcohol abuse and dependence should be aimed at delaying the age at first use of alcohol until later adolescence or young adulthood, the authors warn against jumping to this conclusion. Caution should be used with this type of approach because the relationship between onset of drinking and later alcohol use

disorders is not completely understood. Future studies should be aimed at gaining understanding of this relationship. Many questions must be answered such as whether adverse effects could result from delaying the onset of alcohol use and whether or not it is only the delay or perhaps a combination of many factors that play a role in the inverse relationship between age at first alcohol use and later development of alcohol use disorders. Additional studies which combine epidemiology, etiology, and interventions are recommended in hopes to develop successful strategies to prevent alcohol abuse and dependence.

Schuckit and Smith (2001) found that higher quantity and frequency of alcohol use, problems associated with alcohol use, low affiliation with church, high level of response, poor coping skills, lack of social support, poor behavior control, and positive alcohol expectancies were associated with an increased risk of developing an AUD. The authors suggest focusing intervention on the following areas: avoidance of alcohol-related problems, decrease of positive alcohol expectancies, and help with coping mechanisms for difficult situations. Additionally, a child with a parent who is an alcoholic is at a fourfold risk of developing an AUD compared to one's peers. Individuals with a family history of alcoholism are less likely to transition into a lower level of drinking as they progress into adulthood than individuals without a family history (Jackson et al., 2001). The authors of these studies admit to limitations which may restrict the ability for the results to be applied to the general population. Limitations may include a small sample size of college students, a majority of white individuals, a focus on high-risk individuals, and use of self reported information.

With recognition of all risk factors associated with development of an AUD, we may be better able to reach out to and target high risk youths and help them avoid potential alcohol use problems in the future. The knowledge gained from these studies also provides valuable insight

for the design of intervention programs. Early intervention is extremely important as it may be successful in decreasing physical, social, and mental health problems commonly associated with alcohol use among adolescents.

### *School-Based Prevention/Intervention*

Although there are many types of prevention programs used in schools throughout the United States, alcohol use among adolescents and young adults is still very high. Some school-based substance intervention programs in high school have been successful in increasing knowledge about alcohol misuse prevention and ability to refuse an offer to use alcohol.

Furthermore, such interventions have demonstrated decreased rates of alcohol misuse which would typically have increased instead. Not only do these findings demonstrate a successful intervention program, but they suggest that high school is not too late for intervention.

Additionally, the *keepin' it REAL* intervention program has also shown success in decreasing and also discontinuing substance use among adolescent users by focusing on recognition of risks, wise decision making, and also building good refusal skills. These results are encouraging because they show that current substance users can also benefit from school-based interventions.

Future approaches in which age and gender specific approaches are developed are encouraged. Since individuals are exposed to different situations at different ages and because individuals react differently at various ages, it may best to design programs to be used for specific grades. Creative, new techniques should be developed to teach children how to stand up to peer pressure and resist substance misuse. If preadolescents and adolescents participate in an educational and interventional program every year in school which is customized to their level, it

may be more effective and lead to a lower level of use among these individuals when they reach their teen years and young adulthood.

### *Family-Based Prevention/Intervention*

Because children who grow up in families in which the adults use alcohol and drugs are more likely to display similar behaviors, intervention which addresses parental alcoholism and the commonly associated negative parenting and marital conflicts can be helpful. By offering parental intervention to increase positive parenting and to improve marital relationships, children living in such situations can be helped. Improved parenting and parental authority have been shown to increase positive behaviors by children and decrease negative behaviors in children in alcoholic families (Nye et al., 1999). These improved behaviors may decrease the risk of future problems for sons of alcoholics. Similarly, intervention to decrease an alcoholic father's alcohol use and to increase marital satisfaction can positively impact a preadolescent (Kelley & Fals-Stewart, 2007). This parental treatment is, however less successful when the children are adolescents, compared to preadolescents.

These studies emphasize the importance of early intervention. The benefit of this type of family-based intervention is that the child's risks for a future AUD can be decreased even though the child does not receive intervention himself or herself. This is also important because the child does not have to be specifically targeted to benefit, and because children may still benefit in cases in which the parent is willing to undergo intervention but does not allow the child to do so. Limitations to the study that may decrease the ability to generalize this study are that only the father was an alcoholic and the families were obtained through outpatient treatment.



*Community-Based Prevention/Intervention*

Neighborhoods may have a significant influence on preadolescents and adolescents. Social cohesion, demographics, and neighborhood characteristics play a role in the amount of problems experienced by youth in the neighborhood (Duncan et al., 2002). Higher amounts of social cohesion are associated with less perceived problems with substance abuse among youths. An increased understanding of these relationships may lead to more successful interventions on the neighborhood level to help decrease the use of alcohol and alcohol-related problems among children in higher risk neighborhoods. Additionally, those communities in which youths have higher amounts of commercial access to alcohol, although they are underage, have many more problems in their communities related to underage alcohol use (Dent et al., 2005). Decreased availability of alcohol and stricter enforcement of laws for underage alcohol use have been shown to decrease alcohol problems in such communities. Implementation of programs to achieve these may decrease both problems and crime in communities as well as health problems related to alcohol misuse. These studies were both conducted in the western United States. More studies should be conducted in different regions of the United States so that the data may be generalized to all types of neighborhoods in the US.

## Conclusion

This literature review is merely an introduction to some of the research on alcohol use disorders. The levels of alcohol use among adolescents and later alcohol use disorders are unacceptable. Alcohol use in preadolescents and adolescents has very severe and chronic consequences. The goal is to stress the importance of intervention in our youth to help decrease the chances for such individuals to develop alcohol use disorders. Excessive alcohol use is commonly stigmatized and also has become accepted as a part of adolescence and young adulthood. If we do not take a stand and become serious about this continuous problem, we will continue to fail our youth. The numerous physical, social, and mental health problems will continue and perhaps even increase if the available research is not utilized to create better, more successful intervention programs to use throughout schools and communities. The research identifies the many risk factors for excessive alcohol use and future alcohol use disorders. With this knowledge, we can better understand and target the individuals that may need more intensive intervention programs. Research has demonstrated that there are multiple types of interventions that may provide positive results, but this information must be better developed and implemented, especially for high risk individuals. Education must also be provided so that families can realize the risks and learn what they can do to help their children. As Physician Assistants, recognition of risk factors and education of parents, children, and family members are our responsibilities. We have a unique opportunity to raise awareness about alcoholism and decrease the stigma, judgment, and embarrassment commonly associated with this serious disease. Some children still may not receive help from their families. Therefore, we must make every effort to ensure that they receive the help which they need and deserve at school and in the

community. If we do not take a stand for our children, the sad reality of excessive and problematic alcohol use will only continue and possibly worsen. The future is in our hands.

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### Abstract

**Objective:** This review explored risk factors for development of alcohol use disorders and determined which prevention strategies may effectively reduce the risk for these individuals.

**Method:** The search engines used included MEDLINE, PubMed, the OhioLINK Electronic Journal Center, and PsycINFO. Original research articles and information from the NIAAA and the CDC were the main sources of information.

**Results:** Many factors play a role in the development of alcohol use disorders. These include family history, lifestyle, genetics, environment, age at first drink, social factors, psychiatric factors, expectations, and behaviors. Intervention programs may be implemented in school, family, and community to successfully decrease problematic use by youths. **Conclusions:** Alcohol use, abuse, and dependence are very common in the United States and are associated with numerous adverse effects. Interventions focusing on prevention of alcohol use in adolescents may decrease the number of alcohol use disorders, and therefore adverse effects, experienced later in life.