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Underage Drinking

Underage drinking is a widespread offense that can have serious physical, neurological, and legal consequences. Problematically, it has become quite commonplace. The Office of Juvenile Justice and Delinquency Prevention (OJJDP) works to eliminate underage consumption of alcohol and provide guidance for communities developing prevention and treatment programs.

OJJDP created the underage drinking bulletin series to educate practitioners and policymakers about the problems youth face when they abuse alcohol and to provide evidence-based guidelines. The series presents findings from a study on preventing underage drinking in the Air Force as well as a literature review of the effects and consequences of underage drinking, best practices for community supervision of underage drinkers and legal issues surrounding underage drinking, and practice guidelines for working with underage drinkers.

The series highlights the dangers of underage drinking. Hopefully, the information it provides will support communities in their efforts to reduce alcohol use by minors through the use of evidence-based strategies and practices.

Effects and Consequences of Underage Drinking

Highlights

This bulletin presents findings from a literature review that investigated how underage drinking can affect a youth's physical, emotional, and neurological health. In it, the authors discuss the legal, neurological, economic, and personal consequences youth can face when they make the decision to begin drinking.

The authors highlight the following points:

- The human brain continues to develop until a person is around age 25. Underage drinking may impair this neurological development, causing youth to make irresponsible decisions, encounter memory lapses, or process and send neural impulses more slowly.
- Underage drinking cost society $68 billion in 2007, or $1 for every drink consumed. This includes medical bills, income loss, and costs from pain and suffering.
- In 2009, 19 percent of drivers ages 16–20 who were involved in fatal crashes had a blood alcohol concentration over the legal adult limit (0.08).
- Alcohol use encourages risky sexual behavior. Youth who drink may be more likely to have sex, become pregnant, or contract sexually transmitted diseases.

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Effects and Consequences of Underage Drinking

By raising the drinking age to 21 across the United States, Congress has provided a highly effective strategy to increase youth health and safety. Tens of thousands of lives have been saved in traffic crashes alone. Nonetheless, youth and young adults under age 21 often drink alcoholic beverages. Alcohol consumption is often accepted as normal adolescent and young adult behavior. According to a 2011 report from the National Institute on Drug Abuse, by the time teenagers reached grade 12, almost 71 percent had used alcohol at least once in their lives and 41.2 percent had drunk alcohol during the past month (National Institute on Drug Abuse, 2011). Older adolescents and young adults drink at even higher levels, especially those who attend college (National Institute on Drug Abuse, 2011).

Despite the significant progress that has been made in reducing adolescent drinking and related problems, when a behavior is as pervasive as alcohol use among youth and young adults under age 21, the general public may be tempted to question the emphasis being placed on it. Alcohol use is often considered a rite of passage, and adults who furnish alcohol to minors often abet this use. This casual attitude ignores the serious consequences of alcohol abuse by minors. This bulletin discusses adolescents' neurological, social, and emotional development and examines why youth begin drinking alcohol. It then reviews literature that addresses the neurological, health, behavioral, safety, social, academic, and justice system consequences that result when youth and young adults engage in underage drinking.

Adolescent Brain Development

Scientists once thought that human brains reached their maximum growth in childhood; however, recent research indicates that brain development continues until about age 25 (Coalition for Juvenile Justice, 2006). Consumption of alcohol during the adolescent years can affect brain development and may result in long-term negative effects, including those described below.

- In a study comparing the brains of youth ages 14 to 21 who did and did not abuse alcohol, researchers found that the hippocampi of drinkers were about 10 percent smaller than in those who did not drink. Not only is this finding significant, since the hippocampus is a part of the brain that handles memory and learning, but such effects may be irreversible (American Medical Association, 2010). Alcohol can interfere with adolescents' ability to form new, lasting, and explicit memories of facts and events (Hiller-Sturmhofel and Swartzwelder, n.d.). This has obvious implications for learning and academic performance.
- Alcohol has toxic effects on the myelination process in adolescents (Medical News Today, 2005). Myelination helps stabilize and speed brain processes. Disruption of the myelination process can lead to cognitive deficiencies (Lewohl et al., 2000).
- The pharmacological effects of alcohol and other chemical substances most immediately interfere with optimal brain functioning. Continued use of alcohol and other drugs over time may keep youth from advancing to more complex stages of thinking and social interaction. Youth with alcohol use disorders often perform worse on memory tests and have diminished abilities to plan (Bonnie and O'Connell, 2004).

Adolescent Social and Emotional Development

Adolescents have unique social and emotional characteristics and undergo physical and cognitive changes that can affect their social and emotional development. Some of these characteristics and changes can increase the likelihood that youth will find themselves in dangerous and risky situations when using alcohol at a time when they are particularly vulnerable to negative outcomes from drinking. Understanding adolescents' social and emotional development can provide greater insight into underage drinking, its dangers, and ways to prevent it.

As adolescents struggle for independence and create a personal identity, relationships with their family and peers change. Peer groups may become more important to youth than their families, and peers often provide some of the same functions that family did earlier. Peers become the bridge between the family and the adult social roles the young person must assume (Berk, 2009). Youth look to their peers for support, approval, and belonging. They tend to choose peers who are similar to themselves (Vernon, 2002).

To gain acceptance from their peers, youth tend to dress alike, use similar speech patterns, be enamored of the same heroes, and listen to the same music. They want to steer clear of humiliation, so they try to look and act like their peers to avoid disapproval and negative judgments (Vernon, 2002). Peer pressure often convinces youth to engage in activities to gain one another's approval. This tendency may lead to alcohol use.

On the other hand, some youth face social rejection or neglect and have few peer relationships. These youth are at higher risk for a variety of problems, such as social isolation or withdrawal, lack of appropriate social skills development, and low self-esteem (Holmes, 1995). Furthermore, rejection or neglect may contribute to these youth joining together in antisocial groups.

Whether their peers accept or reject them, youth develop new behavior patterns during adolescence. Caissy (1994) describes a variety of adolescent behavioral characteristics that guide social development:

- **Experimentation.** Youth try different social roles and identities to discover who they are. This may include harmless experiments such as new hairstyles, makeup, dress, and music, or more harmful experimentation such as alcohol and drug use.
- **Rebellion.** Youth rebel against adult authority as a means of learning to make decisions. They often do exactly the opposite of what adults want them to do. Sources of conflict may include curfews, smoking, drinking alcohol, the use of other psychoactive substances, or academic performance.
- **Talking and socializing.** Youth may talk on the telephone, send text messages, interact on social media sites (e.g., MySpace, Facebook, Twitter), or hang out with friends at the mall to socialize. The peer group provides a social form of self-evaluation, and youth need feedback from their peers (Newton, 1995).
- **Preoccupation with themselves.** Youth tend to focus on their needs. They feel they are the topic of others' conversations and others are watching them constantly. They may spend long periods of time self-grooming, monopolizing the telephone or computer, or engaging in other self-centered activities.
- **Risk taking.** Youth often do not realize the consequences that their behavior will have and may take risks because they believe nothing bad will happen to them.

Adolescents undergo many physical and mental changes before they become adults. In addition to their predisposition to peer pressure and social experimentation, adolescents' brains continue to develop through their midtwenties and may be highly vulnerable to the effects of alcohol and other substances.

Factors Contributing to Underage Drinking

Youth and young adults begin to drink alcohol for a variety of reasons. Resource and treatment providers must understand these motives when working with underage drinking offenders and targeting issues. These factors are discussed below.

Emotional Satisfaction From Drinking

Young drinkers want to feel different when they drink. Some of the reasons youth drink include (Johnson, 2004; Bonnie and O'Connell, 2004):

- To relax and lower their inhibitions in social situations.
- To reduce stress, tension, and worries.
- To increase courage and feelings of power.
- To enhance sexual attractiveness and performance.
- To satisfy their curiosity about the feelings that alcohol produces or feel more grown up.

Personal Characteristics of Underage Drinkers

Many studies have identified personal characteristics that may increase the likelihood that a youth will engage in underage drinking. Impulsive or excitement-seeking youth and young adults are more likely to drink alcohol (von Diemen et al., 2008). Rebellious youth may also drink because they do not feel that they are part of society, think they are not bound by rules, and may not want success or responsibility.

Additionally, youth with mental health issues, such as depression or attention deficit hyperactivity disorder, may be at higher risk for substance abuse (Alcoholism: Clinical and Experimental Research, 2007). Similarly, youth who face mental health problems because of physical or sexual abuse may turn to alcohol and drugs as a solution to their trauma (Brannigan et al., 2004).

Family Influence

Parents and siblings can influence a youth's propensity to start drinking. For instance, studies have shown that youth are more likely to drink alcohol when at least one of their parents has a history of alcoholism and alcohol use (King and Chassin, 2004; Essau and Hutchinson, 2008). If parents do not set clear behavioral expectations or monitor their children's behavior, children may be more likely to participate in underage drinking (Bonnie and O'Connell, 2004).

Research has found that family conflict is associated with increases in adolescent alcohol use (Bray et al., 2001). Youth may turn to alcohol (or to peer groups who consume alcohol) in middle adolescence to cope with family conflict. Therefore, alcohol use should not be considered simply a normal stage of adolescent development. Instead, prevention and intervention workers should look deeper into the causes of initial alcohol use.

Peer and School Influences

During adolescence, youth strive for acceptance by their peers. They want to fit in and often choose peer groups whose values and behaviors are similar to their own. If drinking is a typical activity for these groups, they are much more likely to drink. Underage drinking often occurs at social events that peer groups attend, such as sports events, concerts, and parties.

Numerous studies have shown that youth who demonstrate a high involvement in their school, as evidenced by good grades or participation in extracurricular and/or academic activities, are less likely to engage in underage drinking (Pacific Institute for Research and Evaluation, n.d.; Catalano et al., 2004; Henry, Swaim, and Slater, 2005). Youth with poor grades or those who frequently exhibit behavioral problems at school are more likely to drink alcohol, especially if they associate with peers who drink (Mason and Windle, 2001).

Advertising and Media Influences

In today's culture, youth and young adults are bombarded with media and advertisements about drinking. Often, the media make drinking appear sexy and fun. Advertising may include items with alcohol brand names, and alcohol companies may sponsor popular events or give free products to young people (Jernigan and O'Hara, 2004).

Few empirical studies have examined the effects of alcohol advertising in the media. However, some evidence suggests that alcohol advertising may influence the beliefs and behaviors of young people, causing them to drink illegally (Grube, 2004).

Youth Access to Alcohol

Not all merchants are vigilant about preventing underage youth from buying alcohol. Some youth use false identification to buy alcohol; persuade adults to buy it for them; and/or steal alcohol from parents, friends, and commercial establishments. Adults often purchase alcohol and provide it to underage drinkers at parties and events, sometimes with the permission or collusion of parents (Bonnie and O'Connell, 2004).

Neurological Consequences of Underage Drinking

As discussed above, if youth experiment with alcohol, this use may have negative effects on the brain, which continues to develop until the midtwenties. Psychoactive substances such as alcohol produce pleasurable feelings and may diminish stress and emotional pain. These chemicals can turn on the brain's reward system, which makes people want to repeat the use of substances to obtain the same feelings. Eventually, substance use can alter the structure and chemical makeup of the brain, leading to brain disorders (Society for Neuroscience, 2008). In addition, adolescents have a diminished sensitivity to intoxication, making it possible for them to drink more alcohol without feeling very intoxicated. This may be because they have higher metabolic rates (Winters, 2009).

Alcohol use by adolescents is associated with abnormalities in the volume of the prefrontal cortex, the part of the brain that controls reasoning and impulse (Medina et al., 2008). In particular, females are vulnerable to the effects of alcohol on this part of the brain. Severe or chronic alcohol use among female adolescents may limit the development of their prefrontal cortex more than it does for males. Low prefrontal cortex development may lead to deficiencies in reasoning and impulsive behavior.

Alcohol can activate the pleasure-producing chemistry of the brain and release a pleasure-enhancing chemical called dopamine. Dopamine is released in the brain when an action satisfies a basic need or desire. With repeated alcohol use, the brain's natural capacity to produce dopamine is reduced. This leads to feelings of depression, anger, boredom, anxiety, and frustration (O'Connell, 2009).

With the use of alcohol and other drugs over time, youth may fail to advance to more complex stages of thinking and social interaction. Youth with alcohol-use disorders often perform worse on memory tests and have diminished abilities to plan (Bonnie and O'Connell, 2004). Effects may also include hallucinations, psychotic episodes, changes in sleep patterns, and changes in the ability to concentrate.

Health Consequences of Underage Drinking

Underage drinking can lead to behaviors with serious health consequences in both the short and long term. These behaviors are discussed in detail below.

Risky Sexual Behavior

The ramifications of underage drinking and risky sexual behavior are immense. Youth who drink alcohol more commonly engage in sexual intercourse when drinking, have sexual experiences at an earlier age, have sex with multiple partners, engage in unprotected or unplanned sex, experience unexpected pregnancies, have babies with Fetal Alcohol Spectrum (FAS) disorders, and contract sexually transmitted diseases (STDs) than youth who do not drink.

According to the Youth Risk Behavior Survey (Grunbaum et al., 2002), frequent heavy drinkers were more likely than nondrinkers to have had sexual intercourse (87 percent versus 34 percent), sex before age 13 (18 percent versus 5 percent), sex with at least six different partners (31 percent versus 4 percent), and sex with at least three partners in the past month (20 percent versus 2 percent). Frequent heavy drinkers were more likely than nondrinkers to have used alcohol or drugs prior to their most recent sexual activity (52 percent versus 3 percent). Many who engage in sexual activity while drinking report having unprotected sex. Nearly 30 percent of 15- to 17-year-olds and 37 percent of 18- to 24-year-olds say they drink even though they know they may have sex when they are intoxicated and would not when sober (Bonnie and O'Connell, 2004). Another study showed that 31 percent of youth who engaged in frequent heavy drinking reported having at least six different partners, compared with only 4 percent of youth who do not drink (Hingson and Kenkel, 2004).

Youth and young adults who begin drinking early are more likely to have unplanned and unprotected sex (Hingson and Kenkel, 2004), which sometimes results in unwanted pregnancies. Youth who drink alcohol while pregnant face the risk of delivering babies with FAS disorders. Children born with FAS disorders often experience developmental delays and have other birth defects, including abnormal facial features, growth deficiencies, and central nervous system problems (Centers for Disease Control and Prevention, 2006).

Adolescents now represent half of all new cases of HIV/AIDS (Centers for Disease Control and Prevention, 2005). Underage drinking is considered a major contributor to the likelihood that those who engage in sexual activity after consuming alcohol will be more likely to contract an STD because of impaired decisionmaking capabilities. While intoxicated, youth and young adults are more likely to engage in risky sexual behavior, including having sex at a younger age, having unprotected sex, or having sex with multiple partners (Lopez, 2003). Youth themselves seem aware of this risk; one survey found that 52 percent of girls ages 13–18 who were surveyed listed STDs as a major health risk associated with drinking alcohol (Tildon and Kimball, 2005).

Alcohol Poisoning

Alcohol poisoning can occur when a person drinks a large amount of alcohol in a short period of time. About 50,000 people suffer from alcohol poisoning each year, and some die as a result (Alcoholism Information Web Site, n.d.). One of the most dangerous causes of alcohol poisoning is binge drinking (Mayo Clinic, 2008), or imbibing five or more drinks in a short period of time. Teens and college students, most of whom are first-time or inexperienced drinkers, are most likely to binge drink.

Alcohol-Related Mental Health Disorders

Early alcohol use has been shown to increase risk for chronic alcohol addiction and other alcohol problems in later life (Hingson, Heeren, and Winter, 2006; Masten et al., 2009). The American Psychiatric Association, in its *Diagnostic and Statistical Manual of Mental Disorders,* 4th ed. (DSM–IV), established two diagnoses of alcohol use disorders: alcohol abuse and alcohol dependence (American Psychiatric Association, 1994). To be diagnosed with alcohol abuse, at least one of four symptoms[1] must be present within a 1-year period, and to be diagnosed with alcohol dependence, at least three of seven possible symptoms[2] must be present within a 1-year period.

Some researchers and clinicians do not believe that this diagnostic system is adequate for youth. Adolescents tend to experience additional symptoms of problem alcohol use that are not included in these diagnostic criteria, such as blackouts, passing out, risky sexual behavior, craving, and a drop in school grades (Martin et al., 1995). On the other hand, some of the symptoms used in the DSM–IV do not occur frequently among adolescents, including withdrawal and medical problems, both of which usually appear after years of heavy drinking. Hazardous use is frequently associated with driving while intoxicated, which rarely occurs in younger adolescents who cannot drive (Martin and Winters, 1998). Martin and associates (1996) found that, as opposed to the DSM–IV diagnostic criteria, adolescent alcohol symptoms developed in three stages. Some symptoms of dependence typically occurred before abuse symptoms. Their proposed stages are shown in table 1 (page 6). More recent analyses have suggested other ways of making the DSM–IV criteria more useful and accurate for adolescents (Hasin et al., 2003).

Other Drug Use

The younger a person is when he or she begins using alcohol, the more likely he or she is to use other drugs (Hingson, Heeren, and Edwards, 2008). Although many factors can affect whether youth progress to the use of other drugs and which ones they choose to use, alcohol is frequently followed by tobacco, then marijuana, and then other illicit hard drugs (Degenhardt et al., 2009; Gfroerer, Wu, and Penne, 2002; Welte and Barnes, 1985).

Safety Consequences of Underage Drinking

Youth in the United States use alcohol more frequently than any other mood-altering substance. The immediate results of alcohol consumption often include impaired decisionmaking, risky behavior, and poor coordination. This section describes safety problems youth may encounter if they choose to abuse alcohol.

Table 1. Stages of Youth Alcohol Involvement

Stage	Symptoms
Stage 1	• Tolerance. • Drinking larger amounts or for a longer period than intended. • Large amounts of time spent using alcohol. • Failure to fulfill major role obligations at work, school, or home. • Social problems.
Stage 2	• Unsuccessful attempts or a persistent desire to quit or cut down on drinking. • Reduced activities because of alcohol use. • Continued use despite physical or psychological problems. • Hazardous use. • Alcohol-related legal problems.
Stage 3	• Withdrawal.

Source: Martin et al., 1996.

Driving While Impaired

Adolescents and young adults are the least experienced drivers on the road. When they consume alcohol, which impairs their judgment and coordination and makes them more likely to take risks, they cause crashes. In 2009, according to the National Highway Traffic Safety Administration (2010), 5,051 drivers ages 16–20 were involved in fatal motor vehicle crashes. Of those, 19 percent (951) had a blood alcohol concentration over the legal adult limit of 0.08. Of those killed in motor vehicle crashes who had been drinking, 74 percent were not wearing seatbelts. Youth are also more likely to ride in vehicles driven by peers who have been drinking. In 2001, 80 percent of youth who frequently drank alcohol reported they had ridden with a driver who had been drinking (Grunbaum et al., 2002).

Typically, motor vehicle crashes occur while youth are in cars and trucks, but youth may also be impaired on bicycles, motorcycles, or any other type of vehicle. The Youth Risk Behavior Survey (Grunbaum et al., 2002) found that, of the youth who identified themselves as frequent heavy drinkers, almost half (45 percent) never wore motorcycle helmets and a majority (92 percent) never wore bicycle helmets. Vehicle crashes can result in many kinds of injuries, including minor wounds, lifetime disabilities, and death. Injury rates remain unacceptably high.

Other Accidental Injuries and Deaths

Alcohol-related injuries and deaths of youth and young adults from other types of accidents are just as prevalent as alcohol deaths from motor vehicles. In 2000, 6,936 persons younger than age 21 died from alcohol-related accidents, including drowning, burns, and falls. This represented 44 percent of all unintentional injury deaths linked to alcohol among persons younger than age 21 (Hingson and Kenkel, 2004).

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Homicides, Suicides, and Other Violence

Alcohol drinkers engage in more violent acts than nondrinkers. Many such acts are described below.

Homicide. According to Bonnie and O'Connell (2004), about 1,500 (36 percent) of homicides committed in 2000 by someone younger than age 21 involved alcohol consumption. Homicide is the second leading cause of death for youth between ages 15 and 24.

Physical violence. In 2001, the Youth Risk Behavior Survey (Grunbaum et al., 2002) reported that, of youth who drank four or more drinks on at least one occasion during the past 30 days, 44 percent carried a weapon and 22 percent carried a gun, as compared with 10 percent and 3 percent, respectively, of those who never drank. Frequent heavy drinkers became engaged in fights (both in general and at school) more frequently than nondrinkers (Hingson and Kenkel, 2004). In 2001, 696,000 college students were hit or assaulted by another college student who had been drinking (Hingson, Zha, and Weitzman, 2009).

Sexual assault. Dating violence also occurs much more frequently among underage drinkers than nondrinkers. Those who drank heavily and frequently were much more likely to have been hit or slapped by a boyfriend or girlfriend and to have been forced to have sex (Hingson and Kenkel, 2004). More than 70,000 students between ages 18 and 24 are victims of alcohol-related sexual assaults (National Institute on Alcohol Abuse and Alcoholism, 2007). Alcohol is often a factor for both assailants and victims in these assaults. As many sexual assaults are never reported, the actual rates of alcohol-related attacks may be much higher (Bonnie and O'Connell, 2004).

Suicide. Frequent, heavy alcohol use is linked to feelings of depression, hopelessness, and suicide ideation as well as suicide attempts (Dahl and Hariri, 2004). In 2000, approximately 300 alcohol-related youth suicides occurred (Bonnie and O'Connell, 2004).

Social and Emotional Consequences of Underage Drinking

Underage drinking has serious social consequences for youth and young adults. During adolescence, youth shift from being more involved with their families to socializing more with peers. In turn, their peers influence their values and norms, particularly in late adolescence (Bonnie and O'Connell, 2004). If alcohol use is common among their friends, youth may begin drinking.

Heavy and frequent alcohol use may interfere with a young person's capacity to make prosocial choices. Frequent, heavy use of alcohol has been associated with low self-esteem, depression, conduct disorders, antisocial behavior, and anxiety in adolescents (Brown and Tapert, 2004). Developing self-control during adolescence is a major task, but alcohol use may create a dependency that defeats attempts at self-control. Moreover, alcohol use may lead to alienation and stigmatization by peers (Crowe and Schaefer, 1992).

Academic Consequences of Underage Drinking

Alcohol use can impact youth's academic performance. Underage drinkers may miss classes, fall behind in their schoolwork, earn lower grades, and perform poorly on examinations and assignments (Wechsler et al., 2002; Johnson, 2004). They may also drop out, fail classes, or be expelled from school.

Nondrinking youth also can experience negative consequences when other youth drink, including (Johnson, 2004):

- Sleep or study time disruptions.
- Insults or humiliation from drinkers.
- Unwanted sexual advances.
- Time spent taking care of an intoxicated friend.

"Consumption of alcohol during the adolescent years can affect brain development and may result in long-term negative effects."

- Arguments with intoxicated peers.
- Assaults by intoxicated peers.
- Personal property damage.

Family Consequences of Underage Drinking

Families can contribute to underage drinking or can experience the negative consequences of a youth's drinking behavior. The consequences of underage drinking—such as health problems, social difficulties, dropping out of school, or legal consequences—may precipitate a family crisis. While the youth becomes preoccupied with obtaining and drinking alcohol, the family may focus on how to stop the youth's behavior, jeopardizing other family members' relationships and needs. Family members may struggle to control the situation, become resentful, feel guilty, and blame themselves and other family members for the problems that occur. Moreover, family members may try to protect the underage drinker from consequences by compensating and taking up the slack or drawing attention to another problem (Crowe and Schaefer, 1992).

Economic Consequences of Underage Drinking

Underage drinking has both immediate and long-term economic consequences. Recent estimates calculated by the Pacific Institute for Research and Evaluation (n.d.) put the total cost of underage drinking at $68 billion in 2007, as shown in table 2. According to this analysis, underage drinking costs $1 (e.g., rebuilding property damage or vehicles after traffic crashes, medical care, or legal fees for violent acts) for every drink that an underage drinker consumes.

The immediate costs of underage drinking include personal costs and costs to a drinker's family, community, and legal system. Personal costs may include payment for alcohol treatment, medical services (e.g., for injuries in traffic accidents), and insurance (e.g., higher premiums from traffic accidents or convictions for driving under the influence). Parents may lose money driving underage drinkers to appointments and treatment or taking off work to accompany the youth on court dates. The community pays for providing enforcement, supervision, and treatment services to youth and young adults charged with underage drinking (Bonnie and O'Connell, 2004).

Long-term costs are many and varied. One example of a long-term cost is the future potential earnings or contributions a youth will make to the workforce (Bonnie and O'Connell, 2004). This projection assumes that underage drinkers who do not receive treatment services have a greater risk of developing alcoholism or problems associated with alcohol use in adulthood. Although the individual may absorb some of these costs, society also pays because the individual may have difficulty finding and sustaining a good job. Moreover, students who binge drink in college may experience problems with regard to their grades, social life, and employment, which may eventually negatively affect their productivity at work. In the end, the actions of these individuals affect society at the broader level.

Another lifelong cost comes from unwanted pregnancies due to alcohol use. Youth who have children may require welfare for medical care. If their children have FAS disorders, treatment costs may contribute to further community costs.

Table 2. Costs of Underage Drinking

Expense	Cost (in billions)
Medical costs	7.4
Work loss costs	14.9
Lost quality of life costs	45.7
Total	**$68.0**

Source: Pacific Institute for Research and Evaluation, n.d.

Conclusion

Raising the minimum age to purchase alcohol to 21 in the United States has had an exceptionally positive effect on the health and safety of youth. Unfortunately, underage

drinking is still common and can have tragic consequences. Many people view drinking alcohol as a fairly typical activity for youth and young adults, and young people often find it relatively easy to obtain alcoholic beverages. However, the psychoactive properties of alcohol cause impaired decisionmaking, poor coordination, and engagement in risky behaviors. Alcohol use can damage the brain and other body systems and organs.

Underage drinkers often face legal consequences for their actions. When establishing penalties for youth, justice system professionals must work on changing the attitudes and behaviors of underage drinkers to avert further consequences for the youth and their families. Communities and the justice system must provide prevention, intervention, and treatment services early so that youth stop drinking, start living productive lives, and contribute to their communities.

For More Information

This bulletin was adapted from *Underage Drinking: Intervention Principles and Practice Guidelines for Community Corrections* (Crowe et al., 2011). The bulletin highlights the importance of preventing and reducing the consumption of alcohol by youth younger than age 21 and is the second in an OJJDP series on underage drinking. The goal of the series is to better inform practitioners, policymakers, and judges on the effects of underage drinking in the hope that this information will support the development of more effective policy and practice guidelines to combat the problem.

Other bulletins in the series provide guidelines, culled from evidence-based practice literature, to aid community supervision professionals in their work with underage drinkers, outline some of the legal issues that these professionals may encounter when working with underage drinkers, and present findings from an evaluation of OJJDP's Enforcing Underage Drinking Laws initiative implemented in five communities with local Air Force bases.

The bulletins can be accessed from OJJDP's Web site, ojjdp.gov. *Underage Drinking: Intervention Principles and Practice Guidelines for Community Corrections* is available online at www.appa-net.org/eweb/docs/appa/pubs/UDIPPGCC.pdf.

Endnotes

1. These symptoms include role impairment (i.e., frequent intoxication at work, home, or school), hazardous use, legal problems, and social problems.

2. These symptoms include gaining tolerance (i.e., the need to consume more to become intoxicated), going through withdrawal, drinking more or for longer than intended, making unsuccessful attempts to quit, spending a lot of time drinking, reducing social or recreational activities, and developing psychological or physical problems.

References

Alcoholism: Clinical & Experimental Research. 2007. Children with attention deficit hyperactivity disorder at risk for alcohol problems. *ScienceDaily.* Available online: www.sciencedaily.com/releases/2007/03/070326181541.htm.

Alcoholism Information Web Site. n.d. Alcohol poisoning symptoms. Available online: www.alcoholism-information.com/Alcohol_Poisoning_Symptoms.html.

American Medical Association. 2010. *Harmful Consequences of Alcohol Use on the Brains of Children, Adolescents, and College Students.* Chicago, IL: American Medical Association, Office of Alcohol and Other Drug Abuse.

American Psychiatric Association. 1994. *Diagnostic and Statistical Manual of Mental Disorders,* 4th ed. Washington, DC: American Psychiatric Association.

Berk, L.E. 2009. *Development Through the Lifespan,* 5th ed. Boston, MA: Allyn and Bacon.

Bonnie, R.J., and O'Connell, M.E., eds. 2004. *Reducing Underage Drinking: A Collective Responsibility.* Washington, DC: The National Academies Press.

Brannigan, R., Falco, M., Dusenbury, L., and Hansen, W.B. 2004. Teen treatment: Addressing alcohol problems among adolescents. In *Reducing Underage Drinking: A Collective Responsibility,* edited by R.J. Bonnie and M.E. O'Connell. Washington, DC: The National Academies Press, pp. 697–715.

Bray, J.H., Adams, G.J., Getz, J.G., and Baer, P.E. 2001. Developmental, family, and ethnic influences on adolescent alcohol usage: A growth curve approach. *Journal of Family Psychology* 15(2):301–314.

Brown, S.A., and Tapert, S.F. 2004. Health consequences of adolescent alcohol involvement. In *Reducing Underage Drinking: A Collective Responsibility,* edited by R.J. Bonnie and M.E. O'Connell. Washington, DC: The National Academies Press, pp. 383–401.

Caissy, G.A. 1994. *Early Adolescence: Understanding the 10 to 15 Year Old*. New York, NY: Plenum Press.

Catalano, R.F., Haggerty, K.P., Oesterle, S., Fleming, C.B., and Hawkins, J.D. 2004. The importance of bonding to school for healthy development: Findings from the social development research group. *Journal of School Health* 74:252–261.

Centers for Disease Control and Prevention. 2005. 10 leading causes of death, United States. Available online: http://webappa.cdc.gov/cgi-bin/broker.exe.

Centers for Disease Control and Prevention. 2006. Fetal alcohol spectrum disorders. Available online: www.cdc.gov/ncbddd/fas/fasask.htm.

Coalition for Juvenile Justice. 2006. *What Are the Implications of Adolescent Brain Development for Juvenile Justice?* Washington, DC: Coalition for Juvenile Justice.

Crowe, A.H., Mullins, T.G., Cobb, K.A., and Lowe, N.C. 2011. *Underage Drinking: Intervention Principles and Practice Guidelines for Community Corrections.* Lexington, KY: American Probation and Parole Association.

Crowe, A.H., and Schaefer, P.J. 1992. *Identifying and Intervening With Drug-Involved Youth.* Lexington, KY: American Probation and Parole Association.

Dahl, R., and Hariri, A. 2004. *Frontiers of Research on Adolescent Decision Making: Contributions From the Biological, Behavioral, and Social Sciences.* Pittsburgh, PA: University of Pittsburgh School of Medicine, Western Psychiatric Institute and Clinic.

Degenhardt, L., Chiu, W.T., Conway, K., Dierker, L., Glantz, M., Kalaydjian, A., Merikangas, K., Sampson, N., Swendsen, J., and Kessler, R.C. 2009. Does the "gateway" matter? Associations between the order of drug use initiation and the development of drug dependence in the national comorbidity study replication. *Psychological Medicine* 39:157–167.

Essau, C.A., and Hutchinson, D. 2008. *Adolescent Addiction: Epidemiology, Assessment, and Treatment*. Burlington, MA: Academic Press.

Gfroerer, J.C., Wu, L.T., and Penne, M.A. 2002. *Initiation of Marijuana Use: Trends, Patterns, and Implications.* Rockville, MD: U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Office of Applied Studies.

Grube, J.W. 2004. Alcohol in the media: Drinking portrayals, alcohol advertising, and alcohol consumption among youth. In *Reducing Underage Drinking: A Collective Responsibility,* edited by R.J. Bonnie and M.E. O'Connell. Washington, DC: The National Academies Press, pp. 597–624.

Grunbaum, J.A., Kann, L., Kinchen, S.A., Williams, B., Ross, J.G., Lowry, R., and Kolbe, L. 2002. Youth risk behavior surveillance: United States 2001. *Morbidity and Mortality Weekly Report* 51(SS–4):1–64.

Hasin, D., Schuckit, M., Martin, C., Grant, B., Bucholz, K., and Helzer, J. 2003. The validity of DSM–IV alcohol dependence: What do we know and what do we need to know? *Alcoholism: Clinical & Experimental Research* 27(2):244–252.

Henry, K.L., Swaim, R.C., and Slater, M.D. 2005. Intra-individual variability of school bonding and adolescents' beliefs about the effect of substance use on future aspirations. *Prevention Science* 6:101–112.

Hiller-Sturmhofel, S., and Swartzwelder, H.S. n.d. Alcohol's effects on the adolescent brain—What can be learned from animal models. Bethesda, MD: U.S. Department of Health and Human Services, National Institutes of Health, National Institute on Alcohol Abuse and Alcoholism. Available online: http://pubs.niaaa.nih.gov/publications/arh284/213-221.htm.

Hingson, R.W., Heeren, T., and Edwards, W.M. 2008. Age at drinking onset, alcohol dependence, and their relation to drug use and dependence, drinking under the influence of drugs, and motor-vehicle crash involvement because of drugs. *Journal of Studies on Alcohol and Drugs* 69(2):192–201.

Hingson, R.W., Heeren, T., and Winter, M. 2006. Age at drinking onset and alcohol dependence: Age at onset, duration, and severity. *Archives of Pediatrics and Adolescent Medicine* 160(7):739–746.

Hingson, R., and Kenkel, D. 2004. Social, health, and economic consequences of underage drinking. In *Reducing Underage Drinking: A Collective Responsibility,* edited by R.J. Bonnie and M.E. O'Connell. Washington, DC: The National Academies Press, pp. 351–382.

Hingson, R., Zha, W., and Weitzman, E. 2009. Magnitude of and trends in alcohol-related mortality and morbidity among U.S. college students ages 18–24, 1998–2005. *Journal of Studies on Alcohol and Drugs* (supplement 16):12–20.

Holmes, G.R. 1995. *Helping Teenagers Into Adulthood: A Guide for the Next Generation*. Westport, CT: Praeger.

Jernigan, D., and O'Hara, J. 2004. Alcohol advertising and promotions. In *Reducing Underage Drinking: A Collective Responsibility,* edited by R.J. Bonnie and M.E. O'Connell. Washington, DC: The National Academies Press, pp. 625–653.

Johnson, K.D. 2004. *Underage Drinking: Problem-Oriented Guides for Police,* Problem-Specific Guide Series, No. 27. Washington, DC: U.S. Department of Justice, Office of Community Oriented Policing Services.

King, K.M., and Chassin, L. 2004. Mediating and moderated effects of adolescent behavioral undercontrol and parenting in the prediction of drug use disorders in emerging adulthood. *Psychology of Addictive Behaviors* 18(3):239–249.

Lewohl, J.M., Wang, L., Miles, M.F., Zhang, L., Dodd, P.R., and Harris, R.A. 2000. Gene expression in human alcoholism: Microarray analysis of frontal cortex. *Alcoholism: Clinical & Experimental Research* 24(12):1873–1882.

Lopez, R.I. 2003. *The Teen Health Book: A Parent's Guide to Adolescent Health and Well-Being.* New York, NY: W.W. Norton and Company.

Martin, C.S., Kaczynski, N.A., Maisto, S.A., Bukstein, O.M., and Moss, H.B. 1995. Patterns of DSM–IV alcohol abuse and dependence symptoms in adolescent drinkers. *Journal of Studies on Alcohol* 56:672–680.

Martin, C.S., Langenbucher, J.W., Kaczynski, N.A., and Chung, T. 1996. Staging in the onset of DSM–IV alcohol abuse and dependence symptoms in adolescent drinkers. *Journal of Studies on Alcohol* 57:549–558.

Martin, C.S., and Winters, K.C. 1998. Diagnosis and assessment of alcohol use disorders among adolescents. *Alcohol Health and Research World* 22(2):95–105.

Mason, W.Z., and Windle, M. 2001. Family, religious, school and peer influences on adolescent alcohol use: A longitudinal study. *Journal of Studies on Alcohol* 62:44–53.

Masten, A., Faden, F., Zucker, R., and Spear, L. 2009. A developmental perspective on underage alcohol use. *Alcohol Research and Health* 32(1):3–15.

Mayo Clinic. 2008. Alcohol poisoning. Available online: www.mayoclinic.com/health/alcohol-poisoning/DS00861.

Medical News Today. 2005. Breakdown of myelin insulation in brain's wiring implicated in childhood developmental disorders. Available online: www.medicalnewstoday.com/articles/33614.php.

Medina, K.L., McQueeny, T., Nagel, B.J., Hanson, K.L., Schweinsburg, A.D., and Tapert, S.F. 2008. Prefrontal cortex volumes in adolescents with alcohol use disorders: Unique gender effects. *Alcoholism: Clinical & Experimental Research* 32(3):386–394.

National Highway Traffic Safety Administration. 2010. *Traffic Safety Facts, 2009 Data: Alcohol-Impaired Driving.* Washington, DC: National Highway Traffic Safety Administration. Available online: www-nrd.nhtsa.dot.gov/Pubs/811385.pdf.

National Institute on Alcohol Abuse and Alcoholism. 2007. A snapshot of annual high-risk college drinking consequences. Available online: www.collegedrinkingprevention.gov/StatsSummaries/snapshot.aspx.

National Institute on Drug Abuse. 2011. DrugFacts: High school and youth trends. Available online: www.nida.nih.gov/Infofacts/HSYouthtrends.html.

Newton, M. 1995. *Adolescence: Guiding Youth Through the Perilous Ordeal.* New York, NY: W.W. Norton and Company.

O'Connell, J. 2009. The adolescent brain and substance use. Sacramento, CA: California Department of Education. Available online: www.cde.ca.gov/ls/he/at/documents/grfactsheet12.pdf.

Pacific Institute for Research and Evaluation. n.d. *Causal Factors in the Prevention of Underage Drinking.* Calverton, MD: Pacific Institute for Research and Evaluation.

Society for Neuroscience. 2008. *Brain Facts: A Primer on the Brain and Nervous System.* Washington, DC: Society for Neuroscience.

Tildon, M., and Kimball, L. 2005. New survey reveals alarming data on moms, daughters and underage drinking. Washington, DC: The Century Council.

Vernon, A. 2002. *What Works When With Children and Adolescents: A Handbook of Individual Counseling Techniques.* Champaign, IL: Research Press.

von Diemen, L., Bassani, D., Fuchs, S., Szobot, C., and Pechansky, F. 2008. Impulsivity, age of first alcohol use and substance use disorders among male adolescents: A population-based case–control study. *Addiction* 103(7):1198–1205.

Wechsler, H., Lee, J.E., Kuo, M., Seibring, M., Nelson, T.F., and Lee, H.P. 2002. Trends in college binge drinking during a period of increased prevention efforts: Findings from four Harvard School of Public Health study surveys, 1993–2001. *Journal of American College Health* 50(5):203–217.

Welte, J.W., and Barnes, G.M. 1985. Alcohol: The gateway to other drug use among secondary-school students. *Journal of Youth and Adolescence* 14(6):487–498.

Winters, K.C. 2009. Adolescent brain development and alcohol abuse. *The Journal of Global Drug Policy and Practice* 3(3). Available online: http://www.globaldrugpolicy.org/Issues/Vol%203%20Issue%203/Adolescent%20Brain%20Development.pdf.

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