

EXECUTIVE SUMMARY

This document is excerpted from:

The December 2015 Report to Congress on the Prevention and Reduction of Underage Drinking

Introduction

Underage drinking and its associated problems have profound negative consequences not just for underage drinkers, but also for their families, their communities, and society as a whole. Underage drinking contributes to a wide range of costly health and social problems, including motor vehicle crashes (the greatest single mortality risk for underage drinkers), suicide, interpersonal violence (e.g., homicides, assaults, rapes), unintentional injuries (e.g., burns, falls, drowning), brain impairment, alcohol dependence, risky sexual activity, academic problems, and alcohol and drug poisoning. On average, alcohol is a factor in the deaths of approximately 4,300 youths in the United States per year, shortening their lives by an average of 60 years (Centers for Disease Control and Prevention [CDC], 2014a).

National data show meaningful reductions in underage drinking, particularly among younger age groups. From 2004 to 2013, young people ages 12 to 20 showed statistically significant declines in both past-month alcohol use and binge alcohol use.¹ These encouraging results were most significant in the 12- to 17-year-old age group, where past-month alcohol use declined by 34.0 percent, and past-month binge drinking declined by 44.1 percent.

But there is still cause for concern. For example, in 2013, 34.4 percent of 20-year-olds reported binge drinking, which substantially increases the risk of injury or death, in the past 30 days; 11.2 percent of 20-year-olds had, in those 30 days, binged five or more times. Furthermore, although drinking levels are lower at younger ages, patterns of consumption across the age spectrum pose significant threats to health and well-being. Particularly troubling is the erosion of the traditional gap between underage males and females in binge drinking. This gap is disappearing as females' drinking practices converge with those of males; female binge drinking rates have declined more slowly than male binge drinking rates.

Still, there is reason for optimism and hope for continued progress. As discussed in Chapters 3 and 4 of this report, states are increasingly adopting comprehensive policies and practices to alter the individual and environmental factors that contribute to underage drinking and its consequences; these can be expected to reduce alcohol-related death and disability and associated health care costs. These efforts can potentially reduce underage drinking and its consequences and change the norms that support underage drinking in American communities.

Characteristics of Underage Drinking in America

Alcohol Is the Most Widely Used Substance of Abuse Among American Youth

Alcohol continues to be the most widely used substance of abuse among America's youth, and a higher proportion use alcohol than use tobacco or drugs. For example, according to the 2013 Monitoring the Future (MTF) study, 25.7 percent of 10th graders reported using alcohol in the

¹ Binge drinking is defined as the consumption of a large amount of alcohol over a relatively short period of time. No common terminology has been established to describe different drinking patterns. Based on National Survey on Drug Use and Health (NSDUH) data, the Substance Abuse and Mental Health Services Administration (SAMHSA) reports binge drinking as five or more drinks on one occasion on at least 1 day in the past 30 days. Appendix A discusses these issues in more detail.

past 30 days, 18.0 percent reported marijuana use in the past 30 days, and 9.1 percent reported cigarette use in the same period (Johnston, O'Malley, Bachman, Schulenberg, & Miech, 2014a).²

Youth Start Drinking at an Early Age

As discussed below, early initiation to alcohol use increases the risk for a variety of developmental problems during adolescence and for problems later in life. Early initiation is often an important indicator of future substance use (Grant & Dawson, 1998; Hawkins et al., 1997; Robins & Przybeck, 1985). Accordingly, delaying the onset of alcohol initiation may significantly improve later health. Although the peak years of initiation to alcohol are 7th to 11th grades, 10 percent of 9- to 10-year-olds have already started drinking (Donovan et al., 2004), and almost one-fifth of underage drinkers begin before they are 13 years old (CDC, 2014c). About 795,000 people reported initiating alcohol use between the ages of 12 and 14. This translates to approximately 2,013 youths (ages 12 to 14) per day in 2013 who initiated alcohol use (SAMHSA, 2014c).

Binge Drinking

Binge drinking is the most common underage consumption pattern. High blood alcohol concentrations (BACs) and impairment levels associated with binge drinking place binge drinkers and those around them at substantially elevated risk for negative consequences, such as motor vehicle crashes, injuries, unsafe sexual practices, and sexual victimization. Accordingly, reducing binge drinking has become a primary public health priority.

Binge rates increase rapidly with age (Exhibit E.1). In 2013, approximately 5.4 million youths 12 to 20 years old (14.2 percent) reported binge drinking in the past month (SAMHSA, 2014a). Although, in comparison with adults, youths generally consume alcohol less frequently and consume less alcohol overall, they are much more likely to binge drink (Exhibit E.2). Accordingly, most youth alcohol consumption occurs in binge drinking episodes. For example, 92 percent of the alcohol consumed by 12- to 14-year-olds is through binge drinking (Pacific Institute for Research and Evaluation [PIRE], 2002). A significant proportion of underage drinkers consume substantially more than the five-drink binge criterion. For example, averaged 2012 and 2013 data show that 10.2 percent of underage drinkers had nine or more drinks during their last drinking occasion (SAMHSA, 2014c). It is important to note that very young adolescents, because of their smaller size, reach binge drinking BACs with fewer drinks (three to four drinks for people ages 12 to 15) than do older adolescents (e.g., ages 18 or older) (Donovan, 2009).

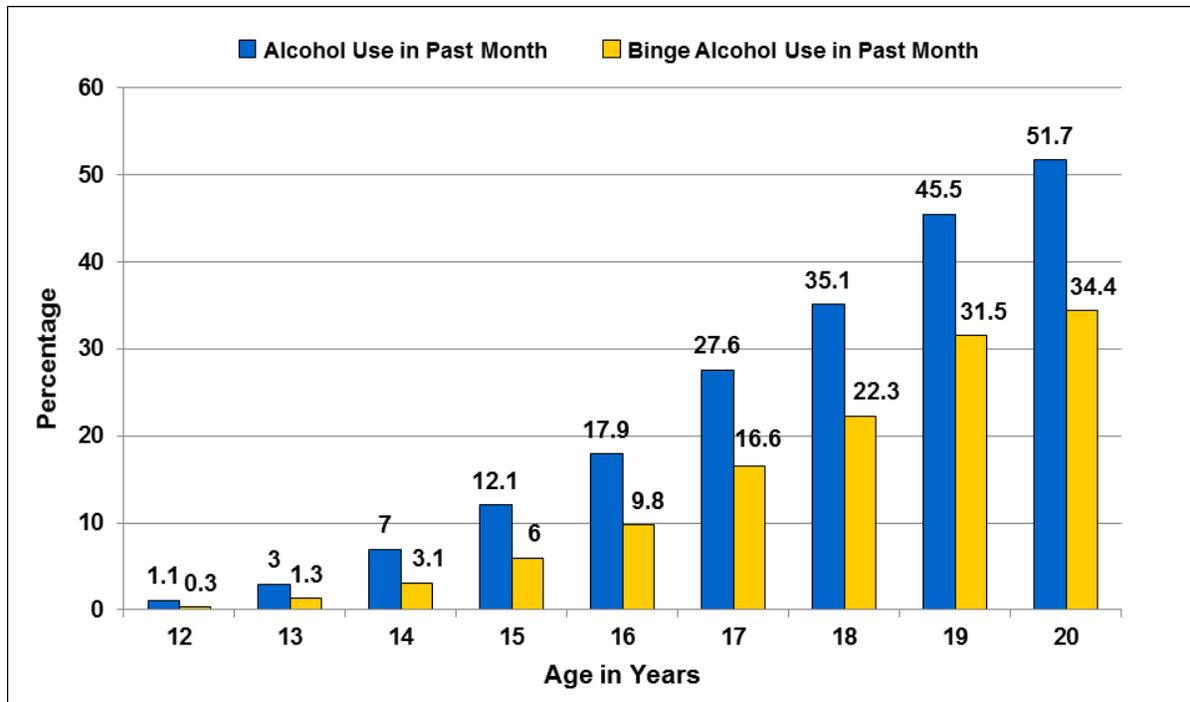
A troubling subset of binge drinking is high-intensity binge drinking, or consumption of 10 or 15 or more drinks on a single occasion. According to MTF data for 2013, 8.1 percent of 12th graders reported consuming 10+ drinks in a row, and 4.4 percent consumed 15+ drinks in a row, within the previous 2 weeks. Although these numbers have declined since 2005, the rate of decline for high-intensity binge drinking has been slower than for all binge drinking (Johnston et al., 2014a).

² For comparability with data from the 2013 NSDUH and 2013 Youth Risk Behavior Survey (YRBS), the latest MTF data included in this report are also from 2013. The 2014 MTF data, available in December 2014, will be included in the next report.

There Is a High Prevalence of Alcohol Use Disorders Among Youth

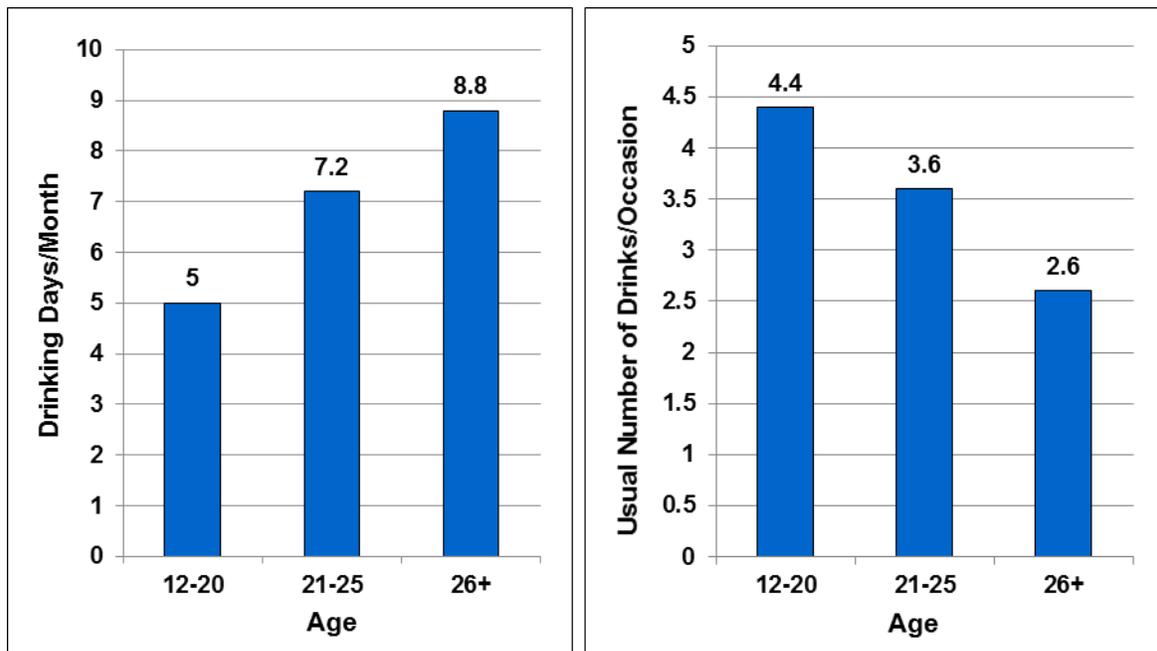
The prevalence of alcohol abuse or dependence among underage drinkers is quite high. Because the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision* (DSM-IV-TR; American Psychological Association [APA], 2000) criteria for abuse and dependence were originally developed for use with adults, using them to assess abuse and dependence in adolescents may lead to inconsistencies.

Exhibit E.1: Current and Binge Alcohol Use Among People Ages 12–20 by Age: 2013 (SAMHSA, 2014b)



As shown in Exhibit E.3, according to NSDUH combined 2012–2013 data, the prevalence of alcohol use disorders, defined as alcohol abuse and dependence by the DSM-IV-TR (APA, 2000), is about one in nine (11.7 percent) among 18- to 20-year-olds. This prevalence is only slightly less than that for 21- to 24-year-olds (15.3 percent), who have the highest prevalence of alcohol use disorders. In addition, 0.9 percent of 12- to 14-year-olds and 5.3 percent of 15- to 17-year-olds met criteria for alcohol use disorder. Because the DSM-IV-TR (APA, 2000) criteria for alcohol use disorders were originally developed for use with adults, using them to assess abuse and dependence in adolescents may lead to inconsistencies in diagnosis.

Exhibit E.2: Number of Drinking Days per Month and Usual Number of Drinks per Occasion for Youth (12–20), Young Adults (21–25), and Adults (≥26): 2013 (SAMHSA, 2014c)



Female Youth Drinking Rates Are Converging With Male Youth Rates

Although underage males and females tend to start drinking at about the same age and have approximately the same prevalence of any past-month alcohol use, males are more likely to drink with greater frequency and to engage in binge and heavy drinking. Since 1991, rates of binge drinking have been *decreasing* for college, 12th-, 10th-, and 8th-grade males and females, and the gap between male and female binge rates has been steadily declining (Johnston, O'Malley, Bachman, & Schulenberg, 2009b; Johnston et al., 2012a, 2014a; Exhibit E.4). Across all grade groups, male binge drinking rates have been decreasing *faster* than female rates. This is most easily seen in the trend data (straight solid lines) in Exhibit E.4. For example, in 1975, among 12th graders there was a 23 percentage point spread between the rates; in 2013, it was 8.0 points (Johnston et al., 2014a).

A number of biological factors may underlie or contribute to gender differences in drinking behavior and its consequences. Schulte, Ramo, and Brown (2009) noted that differences in body composition (e.g., body fat vs. muscle mass) in females led to a greater BAC from the same dose of alcohol proportionate to body weight, and in males to a lower alcohol reactivity (perceived effects of alcohol as a function of amount consumed). Thus, females may experience alcohol-related problems at lower doses of alcohol.

Exhibit E.3: Prevalence of Past-Year DSM-IV-TR Alcohol Dependence or Abuse by Age: 2012–2013 (SAMHSA, 2014c)

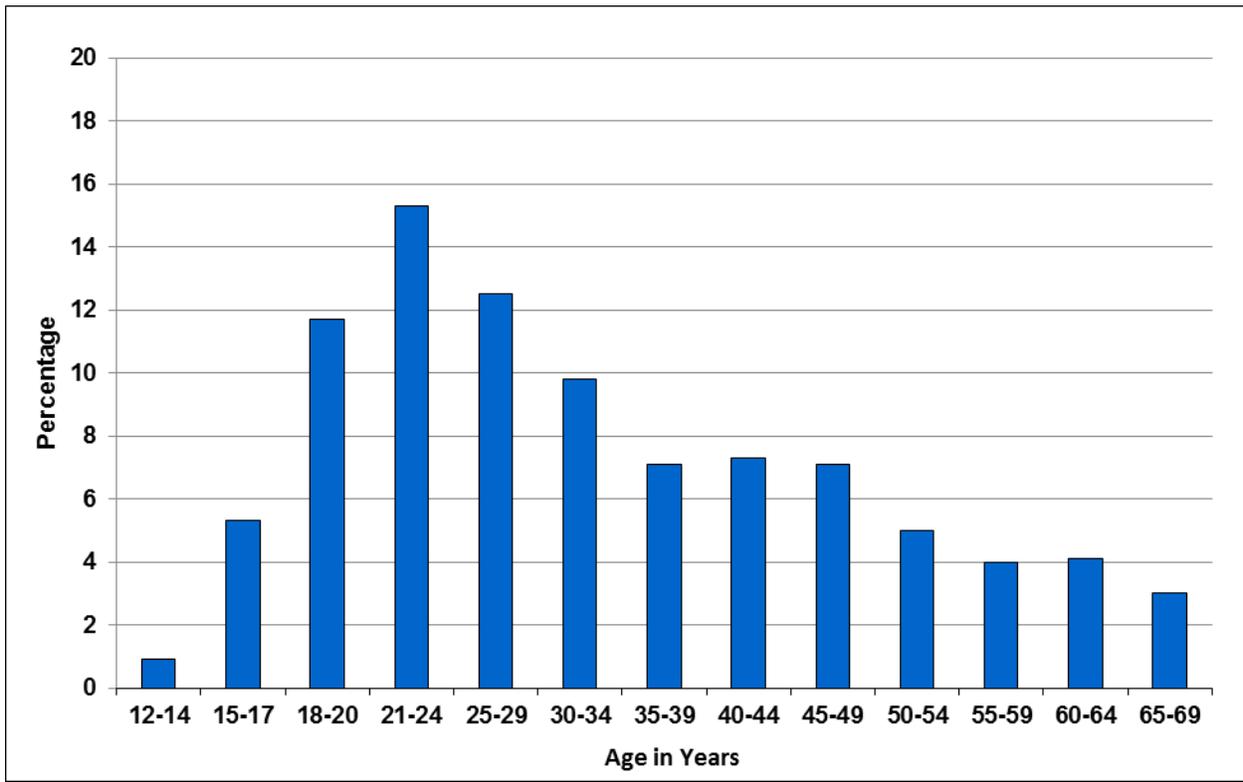
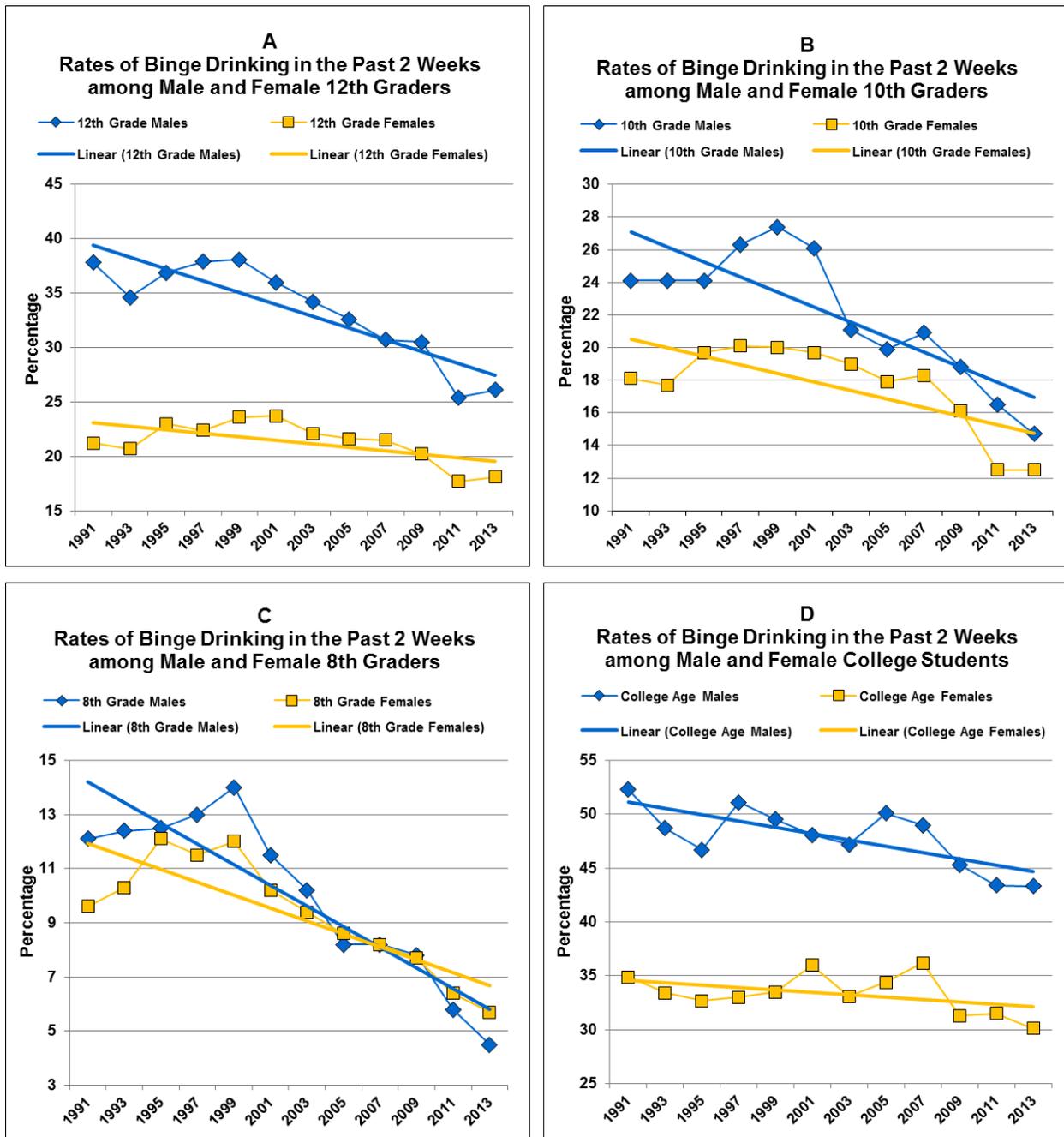


Exhibit E.4: Rates of Binge Drinking in the Past 2 Weeks Among Male and Female 8th, 10th, 12th Graders and College Students, 1991–2013 (Johnston et al., 2014a)³



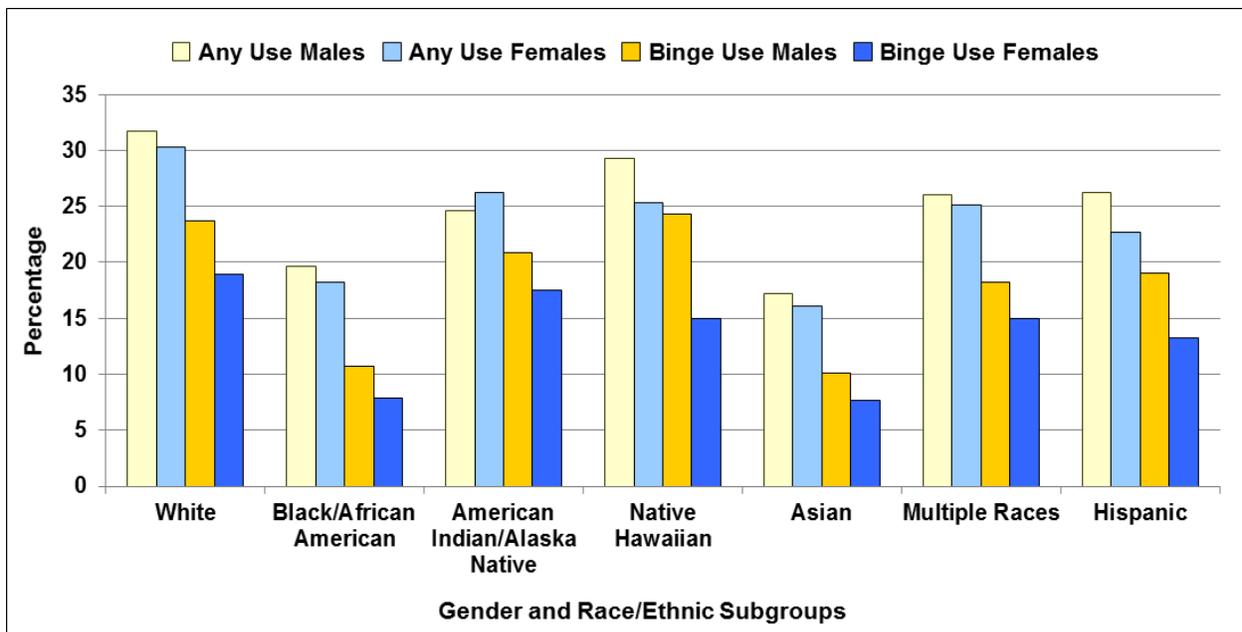
³ Note that the percentage rate scale (y-axis) differs among the four exhibits (A-D) so that the distinctions between males and females within each age group can be easily read. The percentages reflected in each exhibit are the actual percentages.

Drinking Rates Vary by Race and Ethnicity

White youths who are 12 to 20 years old are more likely than any other racial or ethnic group to report current alcohol use. Asian and Black youths had the lowest rates (Exhibit E.5) (SAMHSA, 2014c); however, data indicate that the prevalence of drinking before age 13 is higher among Black and Hispanic youths than among White youths (CDC, 2014c).

These ethnic and racial differences must be viewed with caution. As Caetano, Clark, and Tam (1998) noted, there are important differences in alcohol use and related problems among ethnic and racial subgroups of Whites, Blacks, Hispanics, Asians, and Native Americans/Alaska Natives. Moreover, the authors stressed that the patterns of consumption for any group or subgroup represent a complex interaction of psychological, historical, cultural, and social factors that are not adequately captured by a limited set of labels. With these cautions in mind, the data in Exhibit E.5 highlight the importance of considering race and ethnicity in planning underage drinking countermeasures in specific communities.

Exhibit E.5: Alcohol Use and Binge Drinking in the Past Month Among People Ages 12–20 by Race/Ethnicity and Gender, Annual Averages Based on 2002–2013 Data (SAMHSA, 2014c)



Social Context of Alcohol Use

Underage alcohol use is strongly affected by the context in which drinking occurs, including the number of people present and the location where drinking takes place. Of particular concern is underage drinking at large parties.

Number of People Present at Drinking Event

Most people ages 12 to 20 (79.4 percent) who consumed alcohol in the past month were with two or more people the last time they drank, 14.8 percent were with one other person, and 5.8 percent were alone.⁴ Underage people who drank with two or more other people on the last occasion in the past month had more drinks on average (4.5 drinks) than those who drank with one other person (2.9 drinks) or drank alone (2.7 drinks) (Pemberton, Colliver, Robbins, & Gfroerer, 2008; SAMHSA, 2014c).

Location of Alcohol Use

Most underage drinkers reported last using alcohol in someone else's home (53.5 percent, averaging 4.7 drinks) or in their own home (32.7 percent, averaging 3.5 drinks).⁵ The next most popular drinking locations were at a restaurant, bar, or club (6.7 percent, averaging 4.5 drinks); at a park, on a beach, or in a parking lot (4.5 percent, averaging 4.8 drinks); or in a car or other vehicle (3.7 percent, averaging 6.0 drinks). Thus, most young people drink in social contexts that appear to promote heavy consumption and where people other than the drinker may be harmed by the drinker's behavior.

Underage Drinking Parties

Of particular concern are parties at which large numbers of youth are present. Drinking parties attract those 21 and over as well as significant numbers of underage drinkers (Wells, Graham, Speechley, & Koval, 2005). For this reason, parties are a common environment in which young drinkers are introduced to heavy drinking by older and more experienced drinkers (Wagoner et al., 2012).

Parties are settings for binge drinking and other consumption patterns leading to high BACs (Clapp, Min, Shillington, Reed, & Croff, 2008; Clapp, Reed, Holmes, Lange, & Voas, 2006; Demers et al., 2002; Mayer, Forster, Murray, & Wagenaar, 1998; Paschall & Saltz, 2007; Usdan, Moore, Schumacher, & Talbott, 2005; Wagoner et al., 2012). Factors that increase the risk of high BACs include the size of the party and the number of people drinking (Wagoner et al., 2012), drinking games (Clapp et al., 2006; Clapp et al., 2008), "bring your own booze" policies (Clapp et al., 2006), parties sponsored by fraternities (Paschall & Saltz, 2007), and parties where illicit drugs are available (Clapp et al., 2006). Demers and colleagues (2002) suggested that large parties have a greater facilitative effect on men's drinking compared with women's.

Several studies suggest that drinking parties are settings for aggression, including serious arguments, pushing, fights, and sexual assault (Wagoner et al., 2012). Because large numbers of

⁴ The discussion in this section combines data for 2012 and 2013.

⁵ For the analyses in this section, 2012 and 2013 NSDUH data are combined to provide sufficient sample sizes.

youth are drinking outside their own homes, drinking parties may significantly increase the risk of driving after drinking (PIRE, 2000).

Drinking parties pose serious problems for law enforcement officers. For information on party-related enforcement practices states are implementing, see Chapter 4. For information on relevant state legal policies, see “Hosting Underage Drinking Parties” and “Keg Registration” in Chapter 4.

Types of Alcohol Consumed by Underage Drinkers

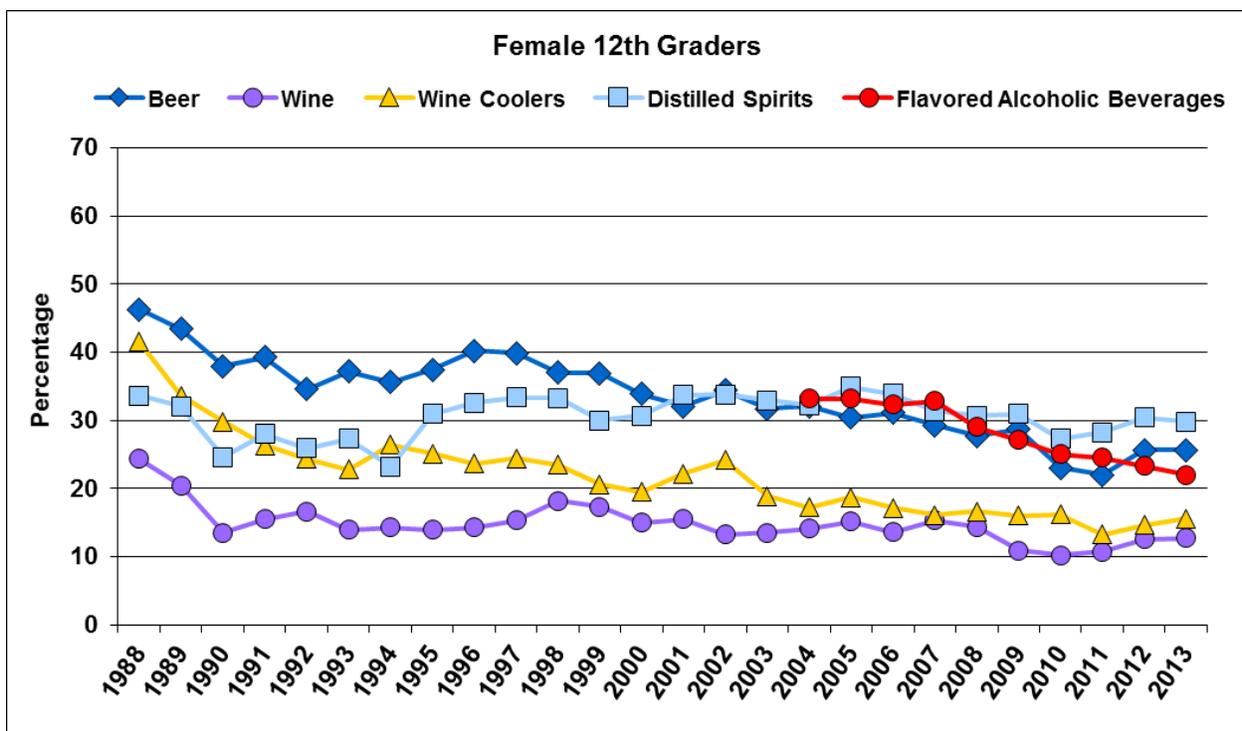
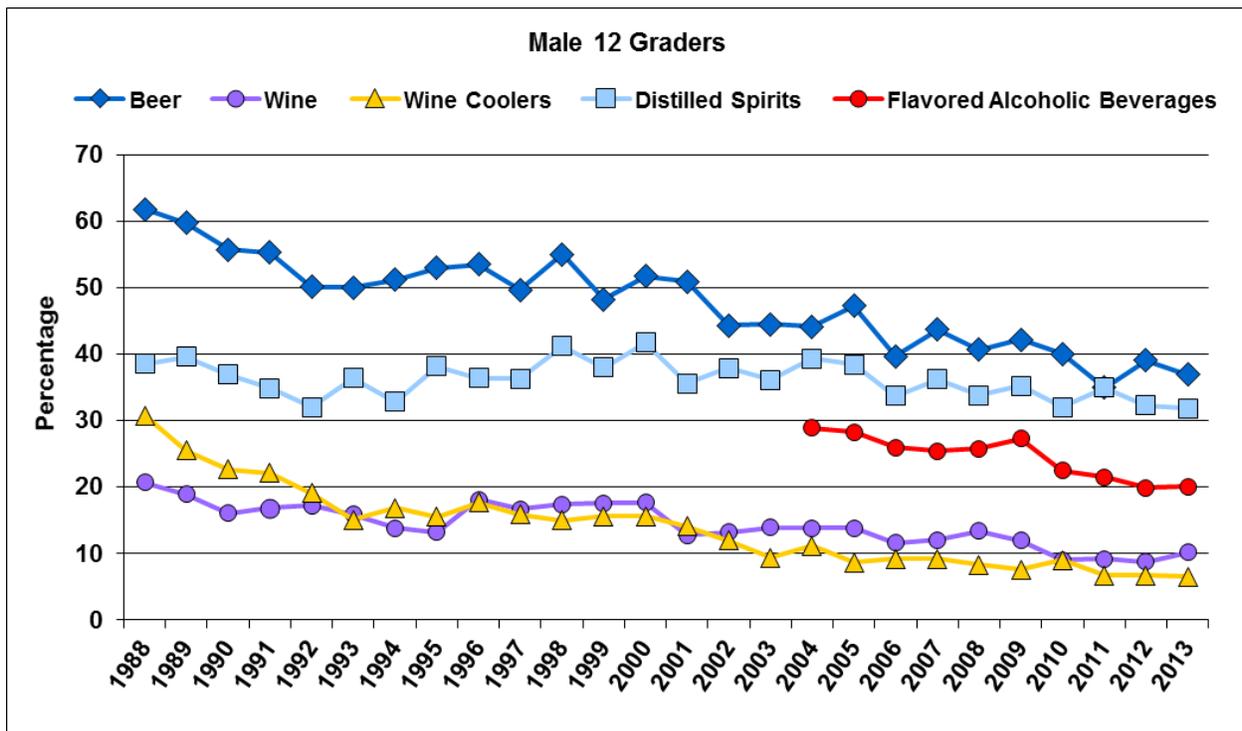
Different alcohol beverage types may be associated with different patterns of underage consumption. Ease of concealment, palatability, alcohol content, marketing strategies, media portrayals, parent modeling, and economic and physical availability may all contribute to the quantity of and settings for consumption. Similarly, beverage types may affect the policies and enforcement strategies that are most effective in reducing underage drinking (CDC, 2007). Tracking beverage preferences among young people is, therefore, an important aspect of prevention policy.

Since 1988, there have been marked shifts in beverage preferences among both male and female 12th graders (Exhibit E.6). Wine is currently preferred by 13 percent or fewer of underage drinkers and is therefore not discussed here.

In 1988, beer was the preferred beverage for both sexes by a large margin. However, preference for beer has declined and preference for distilled spirits has increased. Preference for spirits is now almost equal to preference for beer among males; females now prefer spirits to beer by a slight margin. In 2004 (the first year flavored alcoholic beverages were included in the survey), females’ preference was about the same for beer, distilled spirits, and flavored alcoholic beverages. Their preference for flavored alcoholic beverages has declined steadily since then. Males’ preference for these beverages, which has not been as high as females’ preference, also declined during this period. Data from eight states indicate that, among students in 9th through 12th grades who reported binge drinking, spirits are the most prevalent beverage type (Siegel, Naimi, Cremeens, & Nelson, 2011).

Although reported market share among youth is 0.7 percent, of considerable recent concern is the retail availability of high-potency grain alcohol. These products range in strength from 151 to 190 proof (compared with the 80–101 proof of most spirits). Accordingly, high-potency grain alcohol provides a relatively inexpensive way for underage drinkers to obtain alcohol. Epidemiologic data on the use of high-potency grain alcohol is currently limited. Siegel and colleagues (2014) found that according to an internet panel of youth ages 13 to 20, 5.8 percent of all youth reported consuming high-alcohol-content grain alcohol beverages in the past 30 days. Naimi, Siegel, DeJong, O’Doherty, and Jernigan (2014) reported that when underage drinkers consume grain alcohol, they are significantly more likely to binge drink.

Exhibit E.6: Trends in the Percentage of Male and Female 12th Graders Using Alcoholic Beverages in the Past 30 Days by Beverage Type, 1988–2013 (Johnston et al., 2014b)



Young People Perceive Alcohol To Be Readily Available

Since 1993, youth have reported declines in alcohol availability. However, the number of young people who report that alcohol is fairly easy or very easy to obtain remains high. For example, in 2013, 89.7 percent of 12th graders reported that it was easy or very easy to obtain (Johnston et al., 2014a). Very young drinkers are most likely to obtain alcohol at home from parents or siblings or drink alcoholic beverages stored in the home. In addition, new data suggest that retailer interstate shipping of alcohol has opened up a potentially important avenue of alcohol access for underage people (see below). Please note that some states allow parents, guardians, and spouses to provide alcohol to minors (see Chapter 4).

Youth Drinking Is Correlated With Adult Drinking Practices

Generational transmission has been widely hypothesized as one factor shaping the alcohol consumption patterns of young people. Whether through genetics, social learning, or cultural values and community norms, researchers have repeatedly found a correlation between youth drinking and the drinking practices of parents (Pemberton et al., 2008). Nelson, Naimi, Brewer, and Nelson (2009) demonstrated this relationship at the population (state) level. State estimates of youth and adult current and binge drinking from 1993 through 2005 were significantly correlated when pooled across years.

Xuan and colleagues (2013) analyzed YRBS data from 1999 to 2009 and found a positive correlation between state-level adult binge drinking and youth binge drinking. For individual-level youth drinking outcomes, a 5 percentage point increase in binge drinking prevalence among adults was associated with a 12 percent relative increase in the odds of alcohol use. Paschall, Lipperman-Dreda, and Grube (2013) examined relationships between characteristics of the local alcohol environment and adolescent alcohol use and beliefs in 50 California cities. They observed a greater increase in past-year alcohol use and heavy drinking over time among adolescents living in cities with higher levels of adult drinking. These results suggest that some policies that primarily affect adult drinkers (e.g., pricing and taxation, hours of sale, on-premises drink promotions) may also affect underage drinkers. For corroborating evidence, see Fell, Fisher, Voas, Blackman, & Tippetts (2009). Also, Norberg et al. (2009) reported that people who grew up in states where they could drink legally before age 21 were more likely as adults to meet alcohol and drug abuse and dependence criteria.

Consequences and Risks of Underage Drinking

Driving After Drinking

The greatest mortality risk for underage drinkers is motor vehicle crashes. In 2013, of the 1,691 drivers ages 15 to 20 who were killed in motor vehicle traffic crashes, 492 (29 percent) had a BAC of 0.01 or higher.

Relative to adults, young people who drive after drinking have an increased risk of alcohol-related crashes because of their increased impairment from a given amount of alcohol and perhaps because of their relative inexperience behind the wheel. In a classic paper, Zador (1991) reported that among 16- to 20-year-olds, a BAC of 0.08 g/dL rendered male drivers 52 times more likely and female drivers 94 times more likely than sober gender-matched drivers the same

age to die in a single-vehicle fatal crash. However, the risk of a fatal crash increases as alcohol intake increases, starting at 0.01 g/dL.

O'Malley and Johnston (2013) reported longitudinal data for high school seniors (previous 2 weeks) on driving after drinking any alcohol and after five or more drinks and on being a passenger when the driver has had any alcohol and has had five or more drinks (Exhibit E.7). As can be seen in the exhibit, all four of these behaviors have declined in the last decade, but they remain unacceptably high, especially given the risks associated with driving after even small amounts of alcohol (see above). Males were about twice as likely as females to report driving after drinking, a finding replicated in other studies (CDC, 2014c; Quinn & Fromme, 2012a). Very high percentages of high school seniors who drove after drinking five or more drinks experienced consequences. O'Malley and Johnston (2013) reported that 43.2 percent received a ticket or warning and 30.2 percent were involved in a crash.

Not surprisingly, drinking practices are strongly correlated with driving after drinking. Based on YRBS data, CDC (2012) reported that 84.6 percent of students who reported drinking and driving also reported binge drinking, compared with 26.4 percent of all students. Two studies (LaBrie, Kenney, Mirza, & Lac, 2011; LaBrie, Napper, & Ghaidarov, 2012) found that normative beliefs affect driving after drinking, with higher rates of driving after drinking reported by students who perceived more favorable norms concerning driving after drinking for close friends and typical students.

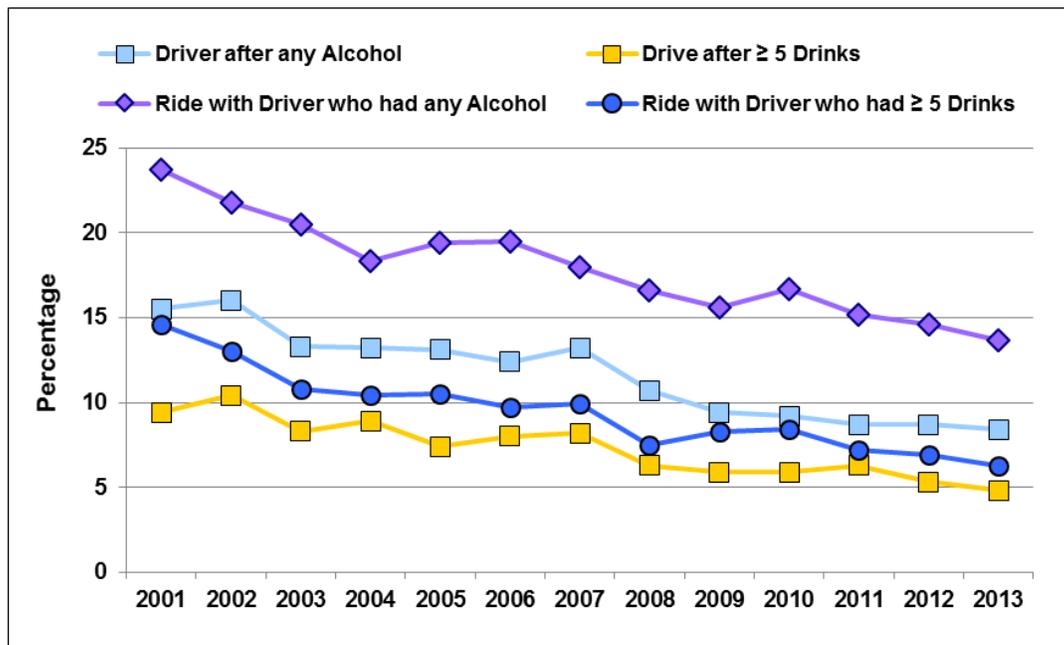
It is an obvious but underappreciated fact that access to cars is a prerequisite for this behavior (see Klitzner, Vegega, & Gruenewald, 1988). O'Malley and Johnston's (2013) data addressed this effect directly: high school seniors who drove more frequently were more likely to engage in driving after drinking.

A number of policy approaches (see Chapter 4) have been shown to reduce driving after drinking and associated mortality and morbidity among youth. Chief among these is the age 21 minimum legal drinking age, even though the law is imperfectly enforced and widely disobeyed (DeJong & Blanchette, 2014; Fell et al., 2009; McCartt, Hellinga, & Kirley, 2010). Fell, Fisher, Voas, Blackman, and Tippetts (2008) examined the effects of a wide variety of laws designed to reduce driving after drinking. They found significant effects of underage purchase and consumption laws and laws related to the production and use of false identification. Cavazos-Rehg and colleagues (2012) used 1999–2009 YRBS data to examine the impact of graduated drivers licensing (GDL) and “use/lose” laws on drinking and driving behaviors of youth ages 16 to 17. Restrictive GDL laws and “use/lose” laws were associated with decreased driving after drinking any alcohol and riding in a car with a driver who had been drinking alcohol.

Other Unintentional Injuries Such as Burns, Falls, and Drowning

In addition to motor vehicle crashes, underage drinking contributes to all major causes of fatal and nonfatal trauma experienced by young people. In 2012, 2,190 youths ages 12 to 20 died from unintentional injuries other than motor vehicle crashes, such as poisoning, drowning, falls, and burns (CDC, 2014b). Research suggests that about 40 percent of these deaths were attributable to alcohol (Smith, Branas, & Miller, 1999).

Exhibit E.7: Trends in Percentage of 12th Graders Reporting Driving After Alcohol Use or Riding After Alcohol Use by the Driver (O'Malley & Johnston, 2013)



Note: The 2012 data came from a special run done by Patrick O'Malley on November 21, 2013. The 2013 data came from a special run done by Patrick O'Malley on November 10, 2014.

Suicide, Homicide, and Violence

Data from 17 states show that among people who died by suicide who were ages 10 to 19 (all of whom were under the legal drinking age in the United States) and were tested, 12 percent had BACs >0.08 g/dL (Crosby, Espitia-Hardeman, Hill, Ortega, & Clavel-Arcas, 2009). One study (Smith et al., 1999) estimated that, for the population as a whole, 31.5 percent of homicides and 22.7 percent of suicides were related to alcohol (i.e., involved a deceased person with a BAC of 0.10 g/dL or greater). Another study on youth suicide estimated that 9.1 percent of suicide-related hospital admissions of those under age 21 involved alcohol and that 72 percent of these cases were attributable to alcohol (Miller, Levy, Spicer, & Taylor, 2006).

Years of Potential Life Lost Due to Alcohol

People under age 21 who die as a result of alcohol use lose an average of 60 years of potential life (CDC, 2014b). By comparison, each person who dies from cancer loses an average of 15 years of life, and each person who dies from heart disease loses an average of 11 years of life (Ries et al., 2003), because these are primarily diseases of older adults.

Risky Sexual Activity

According to the 2007 *Surgeon General's (SG's) Call to Action To Prevent and Reduce Underage Drinking*, underage drinking plays a significant role in risky sexual behavior, including unwanted, unintended, and unprotected sexual activity as well as sex with multiple partners. Such behavior increases the risk for unplanned pregnancy and for contracting sexually transmitted diseases, including infection with HIV, the virus that causes AIDS (Cooper & Orcutt,

1997). When pregnancies occur, underage drinking may result in fetal alcohol spectrum disorders, including fetal alcohol syndrome, which remains a leading cause of intellectual disabilities (Jones, Smith, Ulleland, & Streissguth, 1973; Stratton, Howe, & Battaglia, 1996; Warren & Bast, 1988). A review article by Nolen-Hoeksema cited a number of studies suggesting that underage drinking by both victim and assailant increases the risk of physical and sexual assault (Abbey, 2011; Nolen-Hoeksema, 2004).

Increased Risk of Developing an Alcohol Use Disorder Later in Life

Early-onset alcohol use, alone and in combination with escalated drinking in adolescence, has been noted as a risk factor for development of alcohol-related problems in later life (Agrawal et al., 2009; Dawson, Goldstein, Chou, Ruan, & Grant, 2008; Hingson, Heeren, & Winter, 2006; Hingson & Zha, 2009; Pitkänen, Lyyra, & Pulkkinen, 2005; York, Welte, Hirsch, Hoffman, & Barnes, 2004). Grant and Dawson (1997) found that more than 40 percent of people who initiated drinking before age 13 met diagnostic criteria for alcohol dependence at some time in their lives.⁶ By contrast, alcohol dependence rates among those who started drinking at ages 17 and 18 were 24.5 percent and 16.6 percent, respectively (Exhibit E.8). Data from the 2009–2011 NSDUH survey suggested a similar relationship between age of initiation and development of alcohol-related problems. Only 10 to 11 percent of people who started at age 21 or older met the criteria.

The onset of alcohol consumption in childhood or early adolescence is a marker for later use of drugs, drug dependence, and drug-related crash involvement (Hermos, Winter, Heeren, & Hingson, 2008; Hingson, Heeren, & Edwards, 2008). Moss, Chena, and Yi (2014) found that use of both alcohol and marijuana or a combination of alcohol, marijuana, and cigarettes before age 16 was associated with a spectrum of young adult substance use problems, as well as substance use disorder diagnoses.

Adults who started drinking at age 14 were three times more likely to report driving after drinking too much ever in their lives than were those who began drinking after age 21. Crashes were four times as likely for those who began drinking at age 14 as for those who began drinking after age 21 (Hingson, Heeren, Levenson, Jamanka, & Voas, 2001).

Impaired Academic Performance

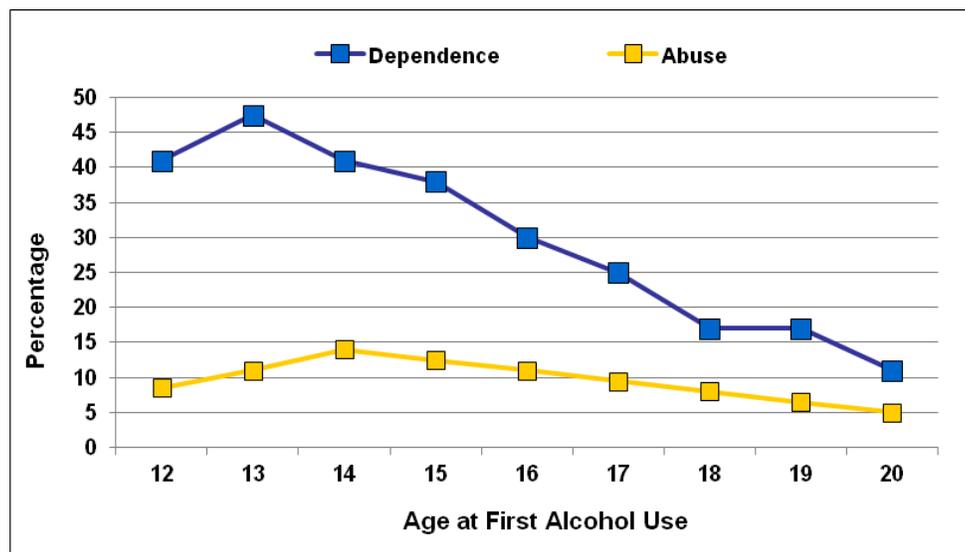
In general, cross-sectional studies have found that students who do poorly in school drink more than students whose school performance is better (Bryant, Schulenberg, & O'Malley, 2003). For example, Miller, Naimi, Brewer, and Jones (2007) found that students who reported binge drinking were three times more likely to report earning mostly Ds and Fs on their report cards, compared with non-binge drinkers.

However, the evidence from longitudinal studies is less clear-cut. Using data from the Youth Development Study (Mortimer, 2003), Owens, Shippee, and Hensel (2008) tracked a panel of youth from their freshman to senior years in high school. They failed to find a significant link across the high-school years between increased drinking and diminishing academic performance. In a 1-year longitudinal analysis of middle-school and high-school students (using the National

⁶ The new criteria for alcohol-related disorders in the DSM-V (APA, 2013) do not specifically address adolescents.

Longitudinal Study of Adolescent Health), Crosnoe, Muller, and Frank (2004) found that, independent of consumption levels, students who drank experienced modest declines (one-tenth of a letter grade) in academic achievement. Using a similar design, Crosnoe (2006) found a stronger association between number of classes failed and later alcohol use than between alcohol use and academic performance. Renna (2008) tracked educational attainment and alcohol use at ages 19 and 25 among two cohorts of 18-year-olds in 1982 and 1983. Binge drinking in the senior year of high school reduced the probability of receiving a high school diploma and increased the probability of graduating later in life with a GED (and hence realizing lower earning potential).

Exhibit E.8: Ages of Initiation and Levels of DSM Diagnoses for Abuse and Dependence (Grant & Dawson, 1997)



Potential Brain Impairment

Adverse effects on normal brain development are a potential long-term risk of underage alcohol consumption. Neurobiological research suggests that adolescence may be a period of unique vulnerability to the effects of alcohol. For example, early heavy alcohol use may have negative effects on the actual physical development of the brain structure of adolescents (Brown & Tapert, 2004) as well as on brain functioning. Negative effects indicated by neuropsychological studies include decreased ability in planning, executive functioning, memory, spatial operations, and attention, all of which play important roles in academic performance and future levels of functioning (Brown, Tapert, Granholm, & Dellis, 2000; Giancola & Mezzich, 2000; Tapert & Brown, 1999; Tapert et al., 2001; Winward, Hanson, Bekman, Tapert, & Brown, 2014). As Brown and colleagues (2000) noted, these deficits may put alcohol-dependent adolescents at risk for falling farther behind in school, putting them at an even greater disadvantage relative to nonusers. Some of these cross-sectional findings are supported by longitudinal analyses (Squeglia, Jacobus, & Tapert, 2009). In a 10-year prospective study, Hanson, Medina, Padula, Tapert, & Brown (2011) found that having a history of heavy alcohol or other substance use during adolescence appears to be more important in determining cognitive deficits than whether individuals continued to have substance-related problems into their mid-twenties.

Underage Drinking Among College Students

In its landmark 2002 report, *A Call to Action: Changing the Culture of Drinking at U.S. Colleges* (henceforth referred to as *The National Institute on Alcohol Abuse and Alcoholism's [NIAAA's] Call to Action*), NIAAA noted the following, which remains the case 13 years later:

The tradition of drinking has developed into a kind of culture—beliefs and customs—entrenched in every level of college students' environments. Customs handed down through generations of college drinkers reinforce students' expectation that alcohol is a necessary ingredient for social success. These beliefs and the expectations they engender exert a powerful influence over students' behavior toward alcohol.⁷

Extent of the Problem

Overall rates of college student drinking and binge drinking exceed those of age peers who do not attend college (Johnston, O'Malley, Bachman, Schulenberg, & Miech, 2014c). Of college students, 78 percent drank and 35.2 percent reported drinking five or more drinks on an occasion in the past 2 weeks. Unlike high school students and same-age peers not in college, binge drinking rates among college students have shown little decline since 1993 (Johnston et al., 2014c). Considering binge drinking trends for only 12th graders with college plans and college students, the slopes of the two trend lines are diverging noticeably. In other words, college students are now drinking more than 12th graders with college plans than they did in past years. This finding suggests that the impact of the college transition may be increasing over time.

Underage college students drink about 48 percent of the alcohol consumed by students at 4-year colleges (Wechsler, Lee, Nelson, & Kuo, 2002). Some college students far exceed the binge criterion of five drinks per occasion (Wechsler, Molnar, Davenport, & Baer, 1999; Wechsler & Nelson, 2008).

Adverse Consequences of College Drinking

The consequences of underage drinking in college are widespread and serious (White & Hingson, 2014). A study of roughly 5,500 college women on two campuses revealed that nearly 20 percent experienced some form of sexual assault while at college (Krebs, Lindquist, Warner, Fisher, & Martin (2009). A review by Abbey (2011) concluded that approximately half of all reported and unreported sexual assaults involve alcohol consumption by the perpetrator, victim, or both. Abbey further reported that typically, if the victim consumes alcohol, the perpetrator does as well.

Hingson and Zha (2009) estimated that annually more than 696,000 college students were assaulted or hit by another student who had been drinking; another 599,000 were unintentionally injured while under the influence of alcohol. Research suggests that roughly 474,000 students ages 18 to 24 have had unprotected sex while under the influence of alcohol, and each year more than 100,000 students ages 18 to 24 report having been too intoxicated to know if they consented to having sex. About 25 percent of college students report academic consequences as a result of their drinking, including missing class, falling behind, doing poorly on exams or papers, and receiving lower grades overall.

⁷ For many students, alcohol use is not a tradition. Students who drink the least attend 2-year institutions, religious schools, commuter schools, and historically black colleges and universities (Meilman et al., 1994, 1995, 1999; Presley et al., 1996a, b).

College Drinking Prevention Best Practices

In 1998, NIAAA convened a Task Force on College Drinking, composed of college presidents, students, and alcohol research experts on college drinking. During a 3-year research and outreach project, the Task Force produced the above-mentioned *NIAAA's Call to Action*, which highlighted the magnitude of the problem and made specific recommendations for addressing the problem based on existing research evidence.

The report recommended that schools use a “3-in-1 Framework” to develop comprehensive programs that integrate multiple complementary strategies. Exhibit E.9 outlines the strategies examined by the NIAAA Task Force, grouped according to the supporting evidence for them and the levels at which they operate.

Since the NIAAA Task Force report was issued in 2002, research on college drinking has continued to yield important information about the potential effectiveness of these and additional intervention strategies. In 2007, after an updated review of college intervention literature, NIAAA issued *What Colleges Need to Know Now: An Update on College Drinking Research*. Current research confirms that interventions targeting individual students, including those at risk for alcohol problems, are effective. In addition, research now more clearly supports the use of environmental interventions, particularly campus–community partnerships, as part of a comprehensive program to address harmful college drinking.

The 2007 *SG's Call to Action* also provided best-practice recommendations for college drinking prevention, including fostering a culture in which alcohol does not play a central role in college life or the college experience. About a quarter of the recommendations of the *SG's Call to Action* specifically overlap the NIAAA 3-in-1 framework. The *SG's Call to Action* also recommends:

- Providing frequent alcohol-free late-night events, extending hours of student centers and athletics facilities, and increasing public service opportunities.
- Offering alcohol-free dormitories that promote healthy lifestyles.
- Restricting or eliminating alcohol sales at concerts and at athletic and other campus events.
- Reinstating Friday classes to shorten the extended weekend.

The Task Force on Community Preventive Services (2010) and the National Research Council/Institute of Medicine's *Reducing Underage Drinking: A Collective Responsibility* (2004), although not specifically focused on college drinking, both support the 3-in-1 framework strategies of aggressive enforcement of underage drinking laws, increasing alcohol prices, and excise tax. Exhibit 4.1.1, “Underage Drinking Prevention Policies – Best Practices,” presented in Chapter 4.1 lists additional policies that may contribute to a reduction in college drinking, especially drinking that occurs in the surrounding community. The policies include dram shop and social host liability; bans on direct sales (internet/mail order); keg registration; minimum ages for servers, sellers, and bartenders; internal possession laws; and restrictions on alcohol advertising.

Exhibit E.9: 3-in-1 Framework

3-IN-1 FRAMEWORK				
Tier	Strategy	Level of Operation		
		Individuals, including At-Risk and Dependent Drinkers	Student Population as Whole	Community
1: Effective among college students	Combining cognitive-behavioral skills with norms clarification & motivational enhancement intervention	Yes	No	No
	Offering brief motivational enhancement interventions in student health centers and emergency rooms	Yes	No	No
	Challenging alcohol expectancies	Yes	No	No
2: Effective with general populations	Increased enforcement of minimum drinking age laws	No	Yes	Yes
	Implementation, increased publicity, and enforcement of other laws to reduce alcohol-impaired driving	No	Yes	Yes
	Restrictions on alcohol retail density	No	No	Yes
	Increased price and excise taxes on alcoholic beverages	No	No	Yes
	Responsible beverage service policies in social & commercial settings	No	Yes	Yes
	The formation of a campus/community coalition	No	Yes	Yes
3: Promising	Adopting campus-based policies to reduce high-risk use (e.g., reinstating Friday classes, eliminating keg parties, establishing alcohol-free activities & dorms)	No	Yes	No
	Increasing enforcement at campus-based events that promote excessive drinking	No	Yes	No
	Increasing publicity about enforcement of underage drinking laws/eliminating “mixed” messages	No	Yes	Yes
	Consistently enforcing disciplinary actions associated with policy violations	No	Yes	No
	Conducting marketing campaigns to correct student misperceptions about alcohol use on campus	No	Yes	No
	Provision of “safe rides” programs	No	Yes	Yes
	Regulation of happy hours and sales	No	Yes	Yes
	Enhancing awareness of personal liability	Yes	Yes	No
	Informing new students and parents about alcohol policies and penalties	Yes	Yes	No
4: Ineffective	Informational, knowledge-based or values clarification interventions when used alone	N/A	N/A	N/A

Moving Forward—NIAAA’s CollegeAIM

NIAAA-supported research has resulted in evidence-based practices that can be used to address harmful drinking and related consequences on college campuses, several of which are mentioned above. To foster the implementation of these strategies, NIAAA convened a new College Presidents Working Group in 2011. Its goals are to bring renewed, vigorous national attention to college drinking; encourage the translation of college prevention research findings into practice; and provide a platform for sharing and disseminating evidence-based information. NIAAA continues to work with this working group of college presidents to address the issue of college drinking. Among the many practical recommendations the presidents made to NIAAA, one stood out: the need for a clear, easy-to-understand tool to help them evaluate and select

interventions that are effective, best fit their schools, and are feasible to implement. In response, NIAAA is developing a matrix-based decision tool that organizes what is known about college drinking interventions by important parameters, such as the strength of the research evidence and ease of implementation. NIAAA enlisted a team of six college drinking research experts to develop the matrix. Next, 10 additional scientific experts reviewed the draft matrix. Their comments were collated and shared with the developers, who have revised the matrix in response. The matrix will form the centerpiece of a guide for college administrators on intervening to prevent harmful drinking on campus. A searchable online decision tool is envisioned as well.

Federal and State Actions Regarding Powdered Alcohol

On March 10, 2015, the U.S. Alcohol Tax and Trade Bureau (TTB), which approves alcohol labeling, issued label approvals for Palcohol, a powdered product. A container of Palcohol contains 3.4 ounces of powder, which, when water is added, contains the equivalent of one shot of distilled spirits. Public health professionals and state government officials raised concerns that, because powdered alcohol could be easily concealed and easily transported, it would have particular appeal to underage drinkers. As of June 2015, 24 states have enacted either permanent or temporary bans on powdered alcohol, and 4 states have expanded the statutory definition of alcohol so that powdered alcohol can be regulated under their existing alcohol statutes. An additional 14 state legislatures and the District of Columbia have introduced bills banning powdered alcohol.

The National Effort To Reduce Underage Drinking

Underage drinking has been recognized as a public health problem for many years. Recently, the national effort to prevent alcohol use by America's young people has intensified as the multifaceted consequences associated with underage drinking have become more apparent. A brief summary of key milestones over the last two decades follows:

1. 1992—Congress created SAMHSA to “focus attention, programs, and funding on improving the lives of people with or at risk for mental and substance abuse disorders.”
2. 1998—Congress mandated that the U.S. Department of Justice, through the Office of Justice Programs' Office of Juvenile Justice and Delinquency Prevention, establish and implement the Enforcing the Underage Drinking Laws program, a state- and community-based initiative.
3. 2004—Congress directed the Secretary of the U.S. Department of Health and Human Services (HHS) to establish the Interagency Coordinating Committee on the Prevention of Underage Drinking (ICCPUD) and to issue an annual report summarizing all federal agency activities related to the problem.
4. 2006—Congress passed the Sober Truth on Preventing (STOP) Underage Drinking Act, Public Law 109-422, popularly known as the STOP Act. The act states, “A multi-faceted effort is needed to more successfully address the problem of underage drinking in the United States. A coordinated approach to prevention, intervention, treatment, enforcement, and research is key to making progress. This Act recognizes the need for a focused national effort, and addresses particulars of the Federal portion of that effort, as well as Federal support for state activities.” The STOP Act also calls for two annual reports: (1) a Report to

Congress from the HHS Secretary (the “Annual Report to Congress”) and (2) a report on state underage drinking prevention and enforcement activities (the “State Report”). Chapters 1–3 of this document constitute the Annual Report to Congress; Chapter 4 constitutes the State Report. Together, they fulfill the STOP Act mandate and are designed to build on the efforts that precede it.

5. 2007—The *SG’s Call to Action To Prevent and Reduce Underage Drinking* (HHS, 2007), the first on that subject, was issued. Based on the latest and most authoritative research at the time, particularly on underage drinking as a developmental issue, the *SG’s Call to Action* outlines a comprehensive national effort to prevent and reduce underage alcohol consumption. The strategies for implementing the goals of the *SG’s Call to Action* are presented in the full *SG’s Call to Action*, which is available at <http://www.ncbi.nlm.nih.gov/books/NBK44360>.

The STOP Act requires the HHS Secretary to report to Congress on “the extent of progress in preventing and reducing underage drinking nationally.” Data presented in Chapter 1 of this report demonstrate that meaningful progress has been made in reducing underage drinking prevalence. The factors that have contributed to this progress are varied and complex, with one clear factor having been the increased attention to this issue at all levels of society. Federal initiatives have raised underage drinking to a prominent place on the national public health agenda, created a policy climate in which significant legislation has been passed by states and localities, raised awareness of the importance of aggressive enforcement, and stimulated coordinated citizen action. These changes are mutually reinforcing and have provided a framework for a sustained national commitment to reducing underage drinking.

Nevertheless, the rates of underage drinking are still unacceptably high, resulting in preventable and tragic health and safety consequences for the nation’s youth, families, communities, and society as a whole. Therefore, ICCPUD remains committed to an ongoing, comprehensive approach to preventing and reducing underage drinking. This document, with its yearly updates to the State Report and survey responses, is part of that sustained effort to reduce underage drinking in America.

Report on State Programs and Policies Addressing Underage Drinking

Recognizing the importance of state programs and policies in preventing underage drinking, the STOP Act directs HHS and ICCPUD to provide an annual report on state underage drinking prevention activities. It defines specific categories of prevention programs, policies, enforcement activities related to those policies, and state expenditures to guide the report’s development. The annual State Report (Chapter 4) provides the following information for the 50 states and the District of Columbia (henceforth referred to as “states”):

1. Information on 25 underage drinking prevention policies focused on reducing youth access to alcohol and youth involvement in drinking and driving
2. Data from a survey addressing underage drinking enforcement programs; programs targeted to youth, parents, and caregivers; collaborations, planning, and reports; and state expenditures on the prevention of underage drinking

The 25 policies included in Chapter 4 can be grouped under four general headings:

- Laws Addressing Minors in Possession of Alcohol

- Laws Targeting Underage Drinking and Driving
- Laws Targeting Alcohol Suppliers
- Alcohol Pricing Policies

Laws Addressing Minors in Possession of Alcohol

1. Underage possession
2. Underage consumption
3. Internal possession by minors
4. Underage purchase and attempted purchase
5. False identification

Laws and the penalties associated with them are designed to raise the costs to underage people of obtaining and consuming alcohol. Such laws provide a primary deterrent (preventing underage drinking among nondrinkers) and a secondary deterrent (reducing the probability that adjudicated youth will drink again before reaching age 21). In addition, laws addressing internal possession facilitate enforcement, and laws regarding false identification for obtaining alcohol make obtaining alcohol more difficult.

Laws Targeting Underage Drinking and Driving

6. Youth blood alcohol concentration limits (underage operators of noncommercial motor vehicles)
7. Loss of driving privileges for alcohol violations by minors (“use/lose” laws)
8. GDLs

Similarly to laws addressing minors in possession of alcohol, these laws seek to deter underage driving after drinking by raising the cost of this behavior. In addition, GDLs restrict driving privileges to reduce the incidence of a variety of risky driving behaviors, including driving while intoxicated.

Laws Targeting Alcohol Suppliers

9. Furnishing alcohol to minors
10. Compliance check protocols
11. Penalty guidelines for sales to minors
12. Responsible beverage service
13. Minimum ages for off-premises sellers
14. Minimum ages for on-premises servers and bartenders
15. Outlet siting near schools
16. Dram shop liability
17. Social host liability
18. Hosting underage drinking parties
19. Retailer interstate shipments of alcohol
20. Direct sales/shipments
21. Keg registration
22. Home delivery

These laws serve to reduce alcohol availability to minors and hence reduce underage drinking. Some of the laws increase the costs to adults and thus deter furnishing alcohol to minors (e.g.,

compliance checks, social host and dram shop liability). Other laws directly impede the furnishing of alcohol (e.g., responsible beverage service, minimum age for servers and sellers, restrictions on direct shipment and home delivery).

Alcohol Pricing Policies

- 23. Alcohol taxes
- 24. Drink specials
- 25. Wholesaler pricing

These policies serve to decrease the “economic availability” of alcoholic beverages through increases in retail price and thus decrease underage drinking and a wide variety of related consequences. The effects of these policies may be direct (e.g., increased taxes, minimum wholesale prices, banning reduced-price drink specials) or indirect (e.g., limiting serving size).

Chapter 4 includes a description of each policy’s key components, the status of the policy across states, and trends over time. Summaries are followed by a state-by-state analysis of each policy.

For more information on these state policies, see the individual state reports and policy summaries in Chapter 4.

State Survey

This section of Chapter 4 provides both the complete responses of the states to the 2014 State Survey (state summaries), and the Cross-State Report. This is the fourth wave of data collection for the State Survey (which was initiated in 2011). Comparisons for selected enforcement activities are presented among data collected between 2011 and 2014.

The survey content was derived directly from the STOP Act, covering topics and using terminology from the act. The survey questions were structured to allow states maximum flexibility in deciding which initiatives to describe and how to describe them. Open-ended questions were used whenever possible to allow states to “speak with their own voices.” As noted earlier, the survey addressed four main areas:

1. Enforcement programs to promote compliance with underage drinking laws and regulations
2. Programs targeted to youth, parents, and caregivers to deter underage drinking
3. State interagency collaboration to implement prevention programs, state best-practice standards, and collaborations with tribal governments
4. The amount that each state invests on the prevention of underage drinking

The Cross-State Report presents data about variables amenable to quantitative analysis. Overall, the 2013 data reveal a wide range of activity in the areas studied, although these vary in scope and intensity from state to state. A key conclusion to be drawn from the STOP Act State Survey is that the states have demonstrated a commitment to the reduction of underage drinking and its consequences. This commitment is evident in the fact that all states and the District of Columbia completed the 90-question survey; reported numerous program activities; and, in many cases, provided substantial detail about those activities. Some of the variability found in the data may be due as much to data unavailability as to whether the activities were actually conducted. For example, only a limited number of states collect data on local enforcement efforts. Given that much of the enforcement of laws pertaining to furnishing minors and minors in possession

occurs at the local level, it is likely that the enforcement statistics reported here actually underestimate the total amount of underage drinking enforcement occurring in the states. Regular and complete collection of both state and local data is critical to building an accurate picture of the national effort to prevent underage drinking.

Data collection and reporting vary greatly from year to year among the states, so it is not possible to compare all states over these 4 years. Fewer than half of the states provided information in all 4 years for six of the enforcement data categories selected for comparison in the Cross-State Report. Therefore, caution should be used in interpreting these data. Forty-nine percent of the states provided minors in possession data, and 63 percent provided state compliance check data for all 4 years. Fifty-six percent of the states that reported data for all 4 years reported a smaller number of minor in possession arrests in 2014 compared with 2011, and 56 percent of the states reported an increased number of compliance checks between 2011 and 2014. Fewer than 20 percent of the states reported on local compliance checks and state expenditures for compliance checks in all 4 years. In all penalty categories, larger percentages of the states reported reduced use of these penalties between 2011 and 2014 than reported increased use.

Enforcement

A significant component of the STOP Act's mission is to collect data and report on each state's performance in enforcing policies designed to prevent or reduce underage drinking. This year's report provides in-depth background on enforcement to provide context for these data.

Discussions are provided of:

- The mechanisms by which enforcement supports policy effectiveness
- Factors that affect the impact of enforcement on policy compliance
- How enforcement is measured
- Empirical studies of enforcement practices

Research suggests that enforcement can result in greater compliance and better public health outcomes (Preusser, Ulmer, & Preusser, 1992). However, enforcement of underage drinking policies is often uneven, inconsistent, and sporadic, and outcomes generally diminish over time (Ferguson, Fields, & Voas, 2000; Forster et al., 1994; Montgomery, Foley, & Wolfson, 2006; Mosher, Toomey, Good, Harwood, & Wagenaar, 2002; Preusser et al., 1992; Voas, Lange, & Tippetts, 1998; Wagenaar & Wolfson, 1995; Wolfson, Wagenaar, & Hornseth, 1995). One study (Wagenaar, Toomey, & Erickson, 2005) found that a compliance check intervention resulted in an immediate 17 percent reduction in underage sales. Over a 3-month period, these effects decayed completely for off-sale premises and by half for on-sale premises.

Three studies (Grube, 1997; Hingson et al., 1996; Holder et al., 2000) have shown that when community-based interventions to prevent underage drinking or other alcohol-related harms include a media campaign, this may increase the public's perception of the likelihood that the law will be enforced and violators sanctioned. Also see McCartt et al., 2009 and Wagenaar, 2000. This increased awareness appears to lead to increased compliance with alcohol-related laws.

A key determinant of enforcement effectiveness is the resources devoted to enforcement actions. A study that examined the relationship among underage alcohol policies in 50 California cities, enforcement of these policies, and adolescent alcohol use identified an inverse relationship

between the funding of enforcement of underage drinking laws and frequency of past-year underage alcohol use (Paschall et al., 2013). Similarly, a study of binge drinking among college students found a significant association between binge drinking rates and state ratings for resources devoted to enforcement (Nelson, Naimi, Brewer, & Wechsler, 2005).

Conclusion

Data in this report demonstrate that meaningful progress has been made in reducing underage drinking prevalence. The factors contributing to this progress are varied and complex, with one clear factor being increased attention to this issue at all levels of society. Federal initiatives, together with efforts by the national media, state and local governments, and interested private organizations, have raised underage drinking to a prominent place on the national public health agenda, created a policy climate in which significant legislation has been passed by states and localities, raised awareness of the importance of aggressive enforcement, and stimulated coordinated citizen action. These changes are mutually reinforcing and have provided a framework for a sustained national commitment to reducing underage drinking.

Nevertheless, the rates of underage drinking are still unacceptably high, resulting in preventable and tragic health and safety consequences for the nation's youth, families, communities, and society as a whole. Therefore, ICCPUD remains committed to an ongoing, comprehensive approach to preventing and reducing underage drinking.