

# A Call for Research on High-Intensity Alcohol Use

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CONSUMING A LARGE amount of alcohol in a single sitting poses acute risks (e.g., impaired driving, injury, memory blackouts, alcohol poisoning) and long-term risks (e.g., alterations to the developing brain, disease, development of alcohol use disorders; National Institute on Alcohol Abuse and Alcoholism, 2015). Research regarding very high quantities of alcohol consumption by youth in the United States is an emerging area of research (e.g., Patrick et al., 2013) and a high public health priority (Hingson and White, 2013). The goal of this commentary is to highlight potential next steps for research on high-intensity alcohol use.

## BINGE DRINKING

To date, the majority of research on high levels of alcohol use has examined “binge drinking,” “heavy episodic drinking,” or “risky single occasion drinking,” each of which is generally defined as consuming 5 or more drinks. The 5+ threshold has proven incredibly valuable and has led to an accumulation of scientific knowledge about alcohol use, including that binge drinking is an important indicator of individuals at risk for alcohol use disorder and is associated with myriad negative consequences (Saha et al., 2007; Wechsler and Nelson, 2001, 2008; Wechsler et al., 1994). Since 2004, the National Institute on Alcohol Abuse and Alcoholism (NIAAA) has defined binge drinking as 4 or more drinks for women and 5 or more drinks for men in a period of 2 hours, because this level of alcohol use typically raises blood alcohol concentration (BAC) to 0.08 g/dl (National Institute on Alcohol Abuse and Alcoholism, 2015).

The inclusion of measures of 5+ drinking across studies has provided substantial information on individuals at risk for consequences, and these measures continue to be valuable. However, a greater understanding of drinking at higher quantities is also needed. As others have noted (e.g., Alexander and Bowen, 2004; Jackson, 2008), the empirical basis for the standard 5+ measure is not as strong as may be assumed

from its proliferation. Depending on an individual's weight, alcohol tolerance, and situational conditions like food intake and hydration prior to drinking, some 5+ binge drinkers may have relatively low (and potentially legal for those aged 21 and older) BACs. Using the single threshold of 5+ alcohol use, without additional measures of higher-quantity drinking, obscures very high-risk drinking. That is, it fails to differentiate those who are most at risk for serious acute consequences due to intoxication far surpassing the legal limit.

## DRINKING BEYOND A BINGE

Given that serious acute consequences of alcohol use (e.g., alcohol poisoning, blackouts) are exponentially more likely after consuming large amounts of alcohol, identifying individuals at the highest levels of use is valuable for public health and safety. Failing to examine the correlates and predictors of higher levels of alcohol use—for example, consuming twice or 3 times as much as the traditional 5-drink cutoff (Hingson and White, 2013; Patrick et al., 2013)—leaves a gap in our knowledge and understanding of alcohol epidemiology and etiology. These higher cutoffs seem to be associated with meaningful differences. For example, young adults consuming 15+ drinks reported more driving after drinking than those consuming 10 to 14 drinks or 5 to 9 drinks, and they were also more likely to drink again after experiencing significant negative consequences such as alcohol-related arrest (Hingson and White, 2013). These data reflect the increased risks for individuals and their communities that accompany high-intensity alcohol consumption.

Research has begun to examine alcohol use that surpasses the 5-drink binge criterion, with several studies documenting that adolescents and young adults commonly drink well beyond it. For example, 18- to 24-year-olds in the United States reported drinking an average of 9.5 drinks per binge-drinking episode (Naimi et al., 2010). In the national Monitoring the Future (MTF) sample, 10.5% of U.S. 12th grade high school students reported consuming 10 or more drinks in a row at least once in the past 2 weeks, and 5.6% reported consuming 15 or more drinks in a row (Patrick et al., 2013). According to Wave II data on maximum drinks from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), 13% of 18- to 20-year-olds drank 15+ drinks in the past year and 3% did so every 2 weeks (Hingson and White, 2013).

In addition to these more general studies, a research literature on event-specific high-risk drinking among college

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*Received for publication August 8, 2015; accepted October 24, 2015.*

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DOI: 10.1111/acer.12945

students has documented very high levels of alcohol use associated with events such as 21st birthdays, Spring Break, sporting events, and holidays (e.g., Neighbors et al., 2007; Rutledge et al., 2008). These studies have shown that very high quantities of alcohol use are consumed in conjunction with specific celebrations, and raise further questions about the extent to which this behavior typically occurs (e.g., on an average weekend). Thus far, the majority of research on drinking that surpasses the 5+ cutoff is among college students (e.g., White et al., 2006), leaving unanswered questions about potential similarities to and differences from young adults who are not in full-time 4-year college.

### MEASUREMENT

The validity of self-reported alcohol consumption is an ongoing area of research and has been a concern of alcohol researchers for decades. In general, it has been determined that self-report methods offer a reliable and valid method for collecting information on alcohol use (Del Boca and Darkes, 2003; Simons et al., 2015). However, at very high levels of use, the ability to self-report may be compromised. There is evidence that when young adults consume 8+ drinks (based on observer reports), they may be more likely to underestimate their alcohol consumption in self-reports (Northcote and Livingston, 2011). These discrepancies in self-reported drinks at very high quantities of alcohol use may be the result of some combination of intoxication interfering with memory and an effort to provide a more socially acceptable response (Northcote and Livingston, 2011). Furthermore, research suggests that there is an overall underreporting of alcohol use due to incorrect estimations of what comprises a standard drink. In particular, people estimate that “a drink” is a larger quantity of alcohol than researchers intend (White et al., 2005). Therefore, the reported prevalence of any threshold of drinking—including 5+, 10+, and 15+ drinks—may be an underestimation of the actual behavior in the population. The extent to which people can accurately self-report very high levels of alcohol use requires additional research (Del Boca and Darkes, 2003).

### NEW TERMINOLOGY

Many researchers (myself included) who have examined very high levels of alcohol use have struggled with the scientific terminology to describe this behavior. We have previously used language such as “extreme binge drinking” (Patrick et al., 2013). However, there are drawbacks to the “extreme” language, including that it sounds enticing and exciting (à la extreme sports). Therefore, the term “high-intensity drinking” seems more appropriate and is consistent with language already used by some scholars to describe alcohol use that is beyond the 5-drink threshold (Byrnes et al., 2013; Koob, 2015; Naimi et al., 2010). A research consensus regarding exactly how many drinks would qualify as high-intensity drinking is needed, although twice the typical

binge-drinking threshold (i.e., 10+ drinks) or twice the typical gender-specific binge-drinking threshold (i.e., 8+ for women, 10+ for men) seem to be a reasonable place to start (e.g., Byrnes et al., 2013; Patrick et al., 2013; White et al., 2006).

### NEXT STEPS FOR RESEARCH ON HIGH-INTENSITY DRINKING

The time to expand our definitions and understanding of high-intensity drinking has come. Even though we have seen historical decreases in alcohol use (Johnston et al., 2015), we have not seen decreases in hospitalizations associated with alcohol overdoses (White et al., 2011). This may be due to the fact that high-intensity drinking has not decreased in the same way that 5+ binge drinking has decreased in recent years (Patrick et al., 2013). Research on “extreme binge drinking” is now solicited by NIAAA through requests for grant applications (e.g., <http://grants.nih.gov/grants/guide/pa-files/PA-14-190.html>). Additional calls for research on the intensity of drinking have been made by NIAAA Director Koob (2015), among others (Naimi et al., 2010). This emerging research area has the potential to shed light on high-intensity drinking with critical public health impacts. Additional research is needed to answer remaining questions about high-intensity drinking and individuals who report it. In particular, I suggest that important questions remain regarding high-intensity drinking and (i) the characteristics of people and situations associated with it, (ii) its normative developmental changes, (iii) behavior within and outside of the college environment, (iv) associations with alcohol use disorders and other severe consequences, (v) how to prevent it, and (vi) related measurement issues.

First, we need information about the characteristics of people and situations that increase the likelihood of high-intensity drinking. People may be more likely to report high-intensity drinking based on sociodemographic factors (Patrick et al., 2013), for example, and additional research evidence is needed to identify these risk factors. Understanding how motivations for alcohol use and intentions to drink and get drunk may contribute to high-intensity drinking could be keys to identifying salient points for intervention. Certain situations may also facilitate high-intensity drinking, such as celebratory events (Neighbors et al., 2007; Rutledge et al., 2008) and drinking contexts (e.g., where bar specials or free drinks are offered). Each of these predictors suggests potential intervention targets and mechanisms, and this basic understanding of high-intensity drinking is a critical first step.

Second, we currently know very little about normative changes in high-intensity drinking across age. The typical developmental course of 5+ drinking (with a peak around age 20 or 21) may or may not apply to high-intensity drinking. Identifying what age groups are most likely to drink to very high levels and what types of developmental patterns may indicate particular risk for acute and long-term negative

consequences will provide information for clinicians, and point to potential sensitive periods for intervention.

Third, we need to understand high-intensity drinking both within the university culture and outside of the college context. A large proportion of the research on high-intensity drinking thus far has focused on college students, and this focus is warranted given that the university context is associated with unique risks for alcohol use. However, it is important to understand alcohol use patterns in the entire population, including young adults who are not enrolled in full-time 4-year college.

Fourth, the extent to which there is a link between high-intensity drinking and alcohol use disorder and other severe alcohol problems should be empirically documented. A single threshold of any level may not be sufficient to identify those at risk; additional research is needed to clarify higher-intensity thresholds that pose risks for different alcohol consequences (e.g., Jackson, 2008; Read et al., 2008). Data regarding typical and peak drinking quantities will be useful here and are available from existing data sets including NESARC and the National Survey on Drug Use and Health. In some cases, the 5+ threshold may continue to be the best indicator and in others a higher threshold may be a better predictor. For example, whether measures of high-intensity drinking (e.g., 10+ drinks) provide a more effective screening tool for individuals in need of alcohol treatment than lower drinking thresholds has important implications for intervention.

Fifth, a key goal should be effective prevention and intervention for high-intensity drinking. We need to document whether existing strategies that are effective for binge drinking also affect high-intensity drinking, or whether new strategies are needed to reduce this behavior and mitigate its negative consequences. Routinely including indicators of high-intensity drinking in prevention trials would help build our collective knowledge (Hingson and White, 2013).

Sixth, it will be important to document whether self-report data of high-intensity drinking is valid and reliable. Questions regarding whether people can accurately estimate how many standard drinks they consumed, remember the number after the drinking episode (even if they were highly intoxicated), and report it in a survey context require empirical examination.

To accomplish all of these goals, researchers should consider including questions regarding maximum number of drinks consumed or high-intensity thresholds (e.g., 10+ drinks or 8+/10+ drinks for women/men) in existing studies, as well as designing new studies specific to high-intensity alcohol use. We should also take advantage of existing national data regarding high-intensity drinking. For example, MTF has included measures of frequency of consuming 10+ and 15+ drinks in a row in the past 2 weeks among annual cross-sectional samples of 12th graders and among longitudinal samples of individuals aged 18 to 30 since 2005. In addition, the NESARC Wave III data collection among adults in the United States in 2012 to 2013 included ques-

tions about the largest number of drinks consumed in a single day in the past year and the frequency of consuming 8+ and 12+ drinks in a single day in the past year. We are building toward a greater understanding of high-intensity drinking, and the accumulation of knowledge regarding this very high quantity alcohol consumption has the potential to shape our future efforts to mitigate the most serious alcohol consequences affecting our public health.

## ACKNOWLEDGMENTS

This research was funded by support from the National Institute on Alcohol Abuse and Alcoholism (R01 AA023504 to M. Patrick). The content here is solely the responsibility of the author and does not necessarily represent the official views of the sponsors. The author declares no conflict of interest.

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