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## **THE IMPACT OF ALCOHOLISM AND ALCOHOL INDUCED DISEASE AND DISORDERS ON AMERICA—A CALL FOR CRITICAL RESEARCH**

Alcoholism is a serious disease affecting millions of Americans that devastates families, burdens the country's health care and social service systems, adversely affects members of the armed forces, and depresses U.S. economic vitality. This disease directly or indirectly touches virtually all Americans. In 2012, 17 million adults ages 18 years and older met the diagnostic criteria for an alcohol use disorder (AUD)<sup>1</sup> a condition determined by a combination of alcohol-related compromise in medical status, reduced work efficiency, significant challenges in interpersonal function, and/or exacerbation or development of other psychiatric conditions.<sup>2</sup> In that same year, approximately 855,000 adolescents (ages 12-17) met the criteria for AUD.<sup>3</sup> It is estimated that 25 percent of persons 18 years of age and over have used alcohol in ways that adversely impacted their families, communities, and society as a whole.

Overall, the estimated costs of alcohol misuse reach approximately \$223.5 billion each year. Medical consequences and alcoholism treatment account for 11 percent of this amount while more than 72 percent is attributable to reduced earnings. The remaining costs are due to lost workforce productivity, accidents, violence, and premature death.<sup>4</sup>

As this paper demonstrates, the harmful impact of alcoholism and alcohol induced disease and disorders on this country and its citizens is undeniable and substantial, and gives rise to a great need for additional research on the disease, its consequences, treatment, and prevention.

### **Consequences**

Critically, as illustrated below, heavy drinkers who do not meet criteria for an alcohol use disorder (AUD) are also at risk for significant health and psychosocial compromise. Heavy drinking is defined by the National Institute of Alcohol Abuse and Alcoholism (NIAAA) as consuming four or more drinks in a single day at least once a week for men, and 3 or more drinks for women, or exceeding 14 drinks/week for men and 7 drinks/week for women. Individual susceptibility to alcohol's effects varies greatly by age, sex, other medical and psychiatric conditions, and sociocultural context. For this reason, defining the relative impact of individual differences in response to alcohol is a prerequisite for identifying optimal prevention and treatment strategies.

Persistent heavy drinkers often exhibit significant changes in brain function and cognitive abilities. Recovery trajectories are highly variable with some abilities requiring months or years to restore. Facilitating cognitive recovery could enhance interpersonal well-being and improve long-term drinking and health outcomes. Systematic studies exploring behavioral and/or pharmacologic interventions to improve these functions are largely lacking. Given the aging U.S. population, there is a need for increased study of the cumulative effects of early and/or continued use of alcohol on age-related cognitive capabilities and decline.

Patterns of heavy drinking and alcoholism are associated with a wide spectrum of health-related consequences, including risk for injury and interpersonal violence. Heavy drinking contributes to each of the top three causes of death -- heart disease, cancer, and stroke-- and ranks as the 3<sup>rd</sup> leading cause of preventable death <sup>(5,6)</sup>. Alcohol consumption levels previously believed to be beneficial are being reconsidered, given data indicating the sex-specific nature of potential benefits and alcohol's role in promoting or exacerbating certain medical conditions including breast cancer. In short, there is a continuing need for research concerning the chronic and acute effects of alcohol on the health of moderate (social) drinkers.

### **Initiation and Trajectories**

Alcohol consumption often begins in early adolescence, yet the personal/genetic/neurobehavioral factors that distinguish those who develop chronic problems from those who do not remains uncertain. Additional study directed to determine different longitudinal risk and trajectories, particularly in regard to sex, gender, race and ethnicity is needed. Given its ubiquitous use, alcohol must also be fully considered when other substances (e.g., marijuana, tobacco, opiates, or other drugs) may be the primary focus. Alcohol use patterns and consumption levels often escalate in young adulthood. Although intervention programs to mitigate heavy drinking and its consequences in young adults are available, they are often inadequately distributed and utilized. Research on more effective prevention efforts is needed to ensure adequate distribution and implementation.

Alcohol use across the lifespan is gaining greater attention, with new evidence indicating that adults over the age of 44 are drinking more than previous cohorts. There is a paucity of research concerning the acute and chronic effects of heavy alcohol consumption on common medical conditions in older adults or addressing how alcohol use impacts cognitive decline.

Alcohol misuse continues to have a significant direct and indirect impact on military personnel, including troop readiness, function, and service outcome. Alcohol misuse is associated with increased negative outcomes arising from combat and noncombat service-related injuries such as traumatic brain injury and PTSD. Scientific advances in understanding the interplay of these variables are essential for developing effective prevention and treatment programs.

### **Prenatal Development**

In recent years, there has been increased study of the effects of prenatal exposure to alcohol on both fetal and child development. Animal and human research models are beginning to identify genetic, environmental, and epigenetic contributors to the resulting impairment, helping to inform appropriate interventions. Infants affected by prenatal alcohol exposure typically mature into adolescence and adulthood with continued behavioral and health issues. This complex yet critical area warrants further research to clarify the long-term interpersonal and health consequences of intra-uterine exposure to alcohol and to identify interventions to mitigate harm.

### **Treatment Advances**

There is strong evidence supporting the effectiveness of both behavior and medication therapies. Unfortunately, only about 10 percent of those needing treatment ever receive it <sup>7</sup> reflecting the need to identify and reduce the individual and sociocultural barriers to treatment. Furthermore, among those who seek treatment, many will relapse within six months following treatment. Although progress in understanding the mechanisms underlying successful recovery has been made, there is a critical need for scientific research directed to defining individual differences that influence the effectiveness of different pharmacological and behavioral treatments.

## Polysubstance Abuse

Alcohol misuse plays a significant role in the initiation and trajectory of all drugs of abuse. The changing legal status of marijuana and the recent widespread misuse of opioids have drawn significant public and governmental attention to the issues surrounding those substances. It is imperative, however, that the clinical and epidemiological data demonstrating alcohol's critical role in fostering opiate use and potentiating the adverse outcomes (including overdose death) associated with polysubstance use be fully considered. The potential costs to individuals and to society dictate that health, economic, and policy implications must be comprehensively queried and that alcohol use be fully incorporated in all such initiatives.

### Conclusion

Although the high rate of chronic alcohol misuse is a continuing and devastating problem of national importance, the U.S. is well positioned to capitalize on unprecedented opportunities in both basic and clinical/translational alcohol research. These opportunities must be seized. Scientists are exploring ways to mitigate alcohol-associated accidents and violence through innovative prevention trials that address problem alcohol use. Sustained efforts to identify factors impacting both risk and resiliency will lead to further improvements in prevention and early intervention. Systematic study of intra-individual and interpersonal factors contributing to the onset of alcohol problems as well as to successful recovery will better inform treatment and relapse prevention efforts. Medication development is now more targeted, providing additional effective tools in addressing this public health threat. Finally, research continues to demonstrate the role of genetics in increasing risk for AUD and its treatment. Innovative genetic research will accelerate medication development and improve our understanding of the complex and heterogeneous etiology of AUDs.

<sup>1</sup>Alcohol use disorders were previously classified as either alcohol abuse or alcohol dependence. Recently accepted criteria (DSM V) eliminate this distinction, assessing alcohol disorders along a continuum ranging from mild to severe. In this paper, the terms %alcoholism+and %alcohol use disorder reference alcohol use accompanied by negative consequences across life domains including physical and/or mental health and/or compromise in interpersonal relationships (family, work, friends, etc.).

<sup>2</sup>Substance Abuse and Mental Health Services Administration (SAMSHA). 2012 National Survey on Drug Use and Health (NSDUH).

<sup>3</sup>Id.

<sup>4</sup>Alcohol Facts and Statistics. Retrieved 23 May 2014 from National Institute on Alcohol Abuse and Alcoholism (NIAAA). Available at: <http://www.niaaa.nih.gov/alcohol-health/overview-alcohol-consumption/alcohol-facts-and-statistics>

<sup>5</sup>Drug Facts: Understanding Drug Abuse and Addiction. Retrieved 23 May 2014 from National Institute on Drug Abuse (NIDA). Available at: <http://www.drugabuse.gov/publications/drugfacts/understanding-drug-abuse-addiction>

<sup>6</sup>Centers for Disease Control and Prevention, Alcohol and Your Health. Available at: <http://www.cdc.gov/alcohol/fact-sheets/alcohol-use.htm>

<sup>7</sup> Substance Abuse and Mental Health Services Administration (US); Office of the Surgeon General (US). Facing Addiction in America: The Surgeon General's Report on Alcohol, Drugs, and Health [Internet]. Washington (DC): US Department of Health and Human Services; 2016 Nov. <https://www.ncbi.nlm.nih.gov/books/NBK424857/>