

NIAAA: ADVANCING ALCOHOL RESEARCH FOR 40 YEARS

As NIAAA moves into its 40th year as the Nation's lead agency on alcohol abuse and alcoholism research, it looks back on a rich and productive investment in research on a wide range of areas, including genetics, neuroscience, epidemiology, health risks and benefits of alcohol consumption, prevention, and treatment. This article by Dr. Kenneth R. Warren and Ms. Brenda G. Hewitt describes how NIAAA has conducted and funded groundbreaking research, distilled and disseminated those research findings to a broad audience, and ultimately improved public health. (pp. 5–17)

PREVENTING ALCOHOL-RELATED PROBLEMS THROUGH HEALTH POLICY RESEARCH

Alcohol-related health policy research is responsible for guiding the implementation of laws and public health policies that have reduced alcohol-related highway injuries and deaths, as well as other alcohol-related problems over the last 40 years. This article by Drs. Robert B. Voas and James C. Fell discusses 10 program categories and highlights four programs to illustrate the scope and complexity of the individual health policy areas within the categories. (pp. 18–28)

REDUCING UNDERAGE AND YOUNG ADULT DRINKING: HOW TO ADDRESS CRITICAL DRINKING PROBLEMS DURING THIS DEVELOPMENTAL PERIOD

When NIAAA was established, alcohol abuse was largely considered to be a disorder of adulthood. However, in an effort to curtail the growing problem of underage drinking and its associated consequences, researchers since then have explored the critical issue of why some youth begin drinking in early adolescence and even may progress to near-alcoholic levels in a short time, whereas most youth only begin drinking in mid- to late adolescence and consume alcohol in small amounts at infrequent intervals and without problems. In this article, Drs. Michael Windle and Robert A. Zucker discuss how research into the developmental aspects of alcohol consumption, and especially initiation of drinking, has helped researchers to better understand the interrelationship between alcohol consumption and developmental transitions or turning points. This research also has contributed to the identification of risk and protective factors that influence susceptibility to underage drinking. (pp. 29–44)

MAGNITUDE AND PREVENTION OF COLLEGE DRINKING AND RELATED PROBLEMS

Research regarding ways to reduce college drinking problems has

shown that individual-oriented interventions, particularly screening and brief motivational counseling interventions, social norms interventions, environmental policy changes such as the minimum legal drinking age of 21 and drinking-and-driving laws, and comprehensive college-community programs, can reduce college drinking and related morbidity and mortality. This article by Dr. Ralph W. Hingson discusses NIAAA's landmark report on college drinking, *A Call to Action: Changing the Culture of Drinking at U.S. Colleges*, as well as other reports, which calls for a collaboration of colleges and communities in the effort to reduce alcohol availability and enforce alcohol policies among college-age individuals. (pp. 45–54)

THE PAST AND FUTURE OF RESEARCH ON TREATMENT OF ALCOHOL DEPENDENCE

Research on the treatment of alcoholism has gained significant ground over the past 40 years. Findings from studies such as NIAAA's Project MATCH, Project COMBINE, and the National Epidemiologic Survey on Alcohol and Related Conditions have led to procedures that allow researchers to better characterize, measure, and monitor the fidelity to a particular conceptual psychotherapeutic approach so that clear comparisons can be made between conceptually and technically distinct approaches.

As noted by Dr. Mark Willenbring, these advances offer a marked improvement over the first models of treatment developed decades ago, which tended to focus on anecdotal findings and assumptions. Researchers now have a better understanding of the natural history of heavy drinking and the development of dependence as well as the course of recovery and the risk factors and prognostic indicators for alcohol use disorders. Most importantly, research has made significant strides in the behavioral and pharmacological treatments available to people, and their families, who suffer from alcoholism. (pp. 55–63)

GENETIC RESEARCH: WHO IS AT RISK FOR ALCOHOLISM?

One main focus of NIAAA-sponsored research since the Institute's inception has been to investigate the role of genetic and environmental factors in the pathogenesis of alcoholism. Once it was apparent from twin, adoption, and family studies that genetics did indeed play a role in alcohol dependence, this research has centered on identifying relevant genes. This overview by Drs. Tatiana Foroud, Howard J. Edenberg, and John C. Crabbe presents some of the genes implicated in the development of alcoholism. Other research is investigating how such genetic influences interact with environmental factors to determine risk for alcohol dependence. The findings of this

genetic research in both humans and animal models will continue to affect our understanding of the causes and factors contributing to this debilitating disease and can potentially guide the development of improved treatments. (pp. 64–75)

SPECIAL SECTION ALCOHOL AND HEALTH

FOCUS ON: THE CARDIOVASCULAR SYSTEM—WHAT DID WE LEARN FROM THE FRENCH (PARADOX)

The term “French Paradox” refers to the fact that the French, despite eating diets high in saturated fats and having a very high rate of smoking, only suffer about one-quarter the rate of coronary heart disease compared with Americans. This has been attributed to their regular consumption of red wine. Because of the resulting interest in alcohol's cardiovascular effects, NIAAA initiated serious investigation on this issue. In this article, Drs. Daria Mochly-Rosen and Samir Zakhari review this research, which demonstrated that moderate alcohol consumption can have beneficial effects on heart health. (pp. 76–86)

FOCUS ON: ALCOHOL AND THE LIVER

Clinical and experimental studies have continued to show a firm connection between high amounts of alcohol consumption and liver disease. This article by Drs. Gyongyi

Szabo and Pranoti Mandrekar reviews advances in alcohol-related liver disease research over the past 40 years and describes how these discoveries are helping scientists to gain insight into therapeutic targets that may help to combat this life-threatening disease. (pp. 87–96)

FOCUS ON: ALCOHOL AND THE IMMUNE SYSTEM

Alcohol abuse suppresses multiple arms of the immune response, leading to an increased risk of infections, such as virus-induced hepatitis, tuberculosis, pneumonia, and HIV/AIDS, as well as to poorer outcomes. Analyses of alcohol's diverse effects on various components of the immune system have provided insight into the factors that lead to a greater risk of infection in the alcohol-abusing population. For example, as Drs. Patricia E. Molina, Kyle I. Happel, Ping Zhang, Jay K. Kolls, and Steve Nelson explain, alcohol interferes with the integrity of the natural barriers formed by cells lining the intestine and lungs, allowing infectious microorganisms to enter the body. In addition, alcohol consumption impairs the function of numerous cell types necessary for the intricately orchestrated responses of the immune system. (pp. 97–108)

FOCUS ON: COMORBID MENTAL HEALTH DISORDERS

Research has shown that a significant proportion of people with alcohol use disorders also suffer

from a comorbid mood or anxiety disorder. This review by Dr. Robert M. Anthenelli discusses the associations among alcohol dependence, major depressive disorder, and posttraumatic stress disorder, as well as examines the role of sex differences in stress circuitry. These differences may explain why men and women differ in their risk for developing comorbid alcoholism and stress-related disorders. (pp. 109–117)

FETAL ALCOHOL SPECTRUM DISORDERS: FROM RESEARCH TO POLICY

During the time NIAAA was established 40 years ago, alcohol was not recognized as an agent that can disrupt the development of a fetus (i.e., teratogen). Today, we understand that prenatal alcohol exposure induces a variety of adverse effects on physical, neurological, and behavioral development. This article by Dr. Jennifer D. Thomas, Dr. Kenneth R. Warren, and Ms. Brenda G. Hewitt discusses NIAAA's contribution to the identification of the range and prevalence of fetal alcohol spectrum disorders (FASD), methods for prevention and treatment of FASD, and some of the ways that NIAAA has contributed to our understanding of FASD, the challenges that we still face, and how this research has translated into changes in public policy. (pp. 118–126)

ALCOHOL'S EFFECTS ON BRAIN AND BEHAVIOR

The neuropsychological impairments that are caused by alcoholism have been recognized for centuries. For the past 40 years, NIAAA has funded multidisciplinary research of brain structure, function, and attending functions to help determine the mechanisms through which alcohol acts on the brain. As Drs. Edith V. Sullivan, R. Adron Harris, and Adolf Pfefferbaum report, one emphasis of this research has been on the functional consequences of alcohol consumption, such as impaired memory processes, problem-solving and cognitive skills, or motor functions. Another focus has been the delineation of alcohol-induced structural damage to the brain, which has been analyzed using increasingly sophisticated imaging technologies such as magnetic resonance imaging (MRI), diffusion tensor imaging, and functional MRI. These advances also have allowed analysis of the course of brain structural changes through periods of drinking, abstinence, and relapse. (pp. 127–143)

THE POTENTIAL OF NEUROSCIENCE TO INFORM TREATMENT

Forty years after the founding of NIAAA, researchers have developed a better understanding of how brain circuits and brain chemical systems are involved in the development and maintenance of

alcoholism and other drug dependence. In this article, Dr. George F. Koob explores the processes involved in addiction development and describes how this research has helped identify new targets for treatment. These findings already have culminated in the development of new medications (e.g., naltrexone and acamprosate), and other medications that can address different aspects of the dependence syndrome are in the pipelines. The availability of a wider variety of medications will increase the likelihood of successful treatment. (pp. 144–151)

ETHNICITY AND HEALTH DISPARITIES IN ALCOHOL RESEARCH

National surveys show variations across ethnicities in drinking, alcohol use disorders, alcohol problems, and treatment use. Explanations for these differences are complex, likely affected by risky drinking behaviors, immigration experiences, racial/ethnic discrimination, economic and neighborhood disadvantage, and variations in alcohol-metabolizing genes. This article by Drs. Karen Chartier and Raul Caetano discusses the challenges associated with reducing and ultimately eliminating health disparities in the alcohol field and how research must maintain a systematic, strong, and growing focus on ethnic minorities. (pp. 152–160)