

# NIAAA SPECTRUM

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U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES • National Institutes of Health • National Institute on Alcohol Abuse and Alcoholism

## FEATURE

### AS MALE AND FEMALE DRINKING PATTERNS BECOME MORE SIMILAR, ADVERSE ALCOHOL RISKS FOR WOMEN BECOME MORE APPARENT



The steady near-equalization in patterns of alcohol use and misuse between women and men over the last decade has revealed women's greater risks for alcohol-related consequences. A [2015 National Institute on Alcohol Abuse and Alcoholism \(NIAAA\)-led analysis](#) of annual data from the

National Survey on Drug Use and Health found that differences in measures such as current drinking, number of drinking days per month, reaching the criteria for alcohol use disorder (AUD), and driving under the influence of alcohol in the past year all narrowed for U.S. females and males between 2002 and 2012. An [analysis of six different national surveys between 2000 and 2016](#) suggests that the number of women ages 18 and older who drink each year increased by 6 percent but the number of men who drink each year decreased by 0.2 percent, and the number of women who binge drink increased by 14 percent but the number of men doing so increased by only 0.5 percent. At the same time, [analyses of the adverse effects of alcohol](#) have shown that, compared to men, women are more likely to experience blackouts, liver inflammation, brain atrophy, cognitive deficits, certain cancers, negative affect during withdrawal and stress, and anxiety-induced relapse.

“A consistent finding of epidemiological studies in recent years has been that measures of total alcohol consumption and misuse among women have largely converged with those of men, and women are more likely to suffer harmful consequences of drinking,” says NIAAA Director George F. Koob, Ph.D. “While men still hold a dubious ‘lead’ in these categories, the differences are much smaller now than they were throughout the last

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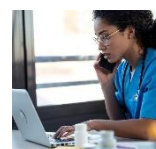


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century, when measures of alcohol consumption and harmful alcohol use by men exceeded those of women by as much as a 3 to 1 margin.”

### Higher Blood Alcohol Concentration (BAC) and More Alcohol Pathology

[Studies show](#) that women start to have alcohol-related problems sooner and at lower drinking levels than men do—and for multiple reasons. On average, women weigh less than men. Also, alcohol resides predominantly in body water and, pound for pound, women have less water in their bodies than men. This means that after a woman and a man of the same weight drink the same amount of alcohol, the woman’s blood alcohol concentration (BAC, the amount of alcohol in the blood) will tend to be higher, putting her at greater risk for harm. Reaching the “binge drinking” threshold of 0.08 percent BAC tends to require fewer standard drinks for females than males—roughly 4 drinks in 2 hours instead of 5 drinks in 2 hours. Other biological differences may contribute to [women’s alcohol-related problems](#) as well.

Studies also show that women have faster progression of AUD than men and are at greater risk than men for certain alcohol-related consequences. For example, compared with men, women with alcohol-associated liver disease have a more rapid progression to fibrosis that persists after abstinence from alcohol. Studies demonstrate that women who consume about 1 drink per day have a 5 to 9 percent higher chance of developing breast cancer than women who do not drink at all.

Alcohol-related medical emergencies and deaths are increasing among women as well. Although men still account for most emergency department (ED) visits, women are catching up. For instance, [between 2006 and 2014, the number of ED visits involving alcohol](#) increased by 58 percent for men and by 70 percent for women. Unfortunately, women are less likely than men to be advised about the risk of binge drinking, and women who report binge drinking are less likely to be advised to reduce their drinking.

And in [October 2020, the U.S. Centers for Disease Control and Prevention \(CDC\) reported](#) that the rate of alcohol-induced deaths among women in rural areas more than doubled between 2000 and 2018, rising 150 percent, compared with a 50 percent increase among males over the same period.

### Drinking To Cope

For some time, [research suggested](#) that levels of anxiety and depression are increasing among adolescents and young adults, particularly females. [CDC recently reported](#) that ED visits for suicide attempts increased 51 percent for adolescent females during the pandemic compared to 4 percent for males. Evidence also suggests that females, in general, are more likely than males to drink to cope. [Drinking to cope](#) is associated with a faster progression of alcohol misuse and a higher incidence of alcohol-related harms. The percentage of adolescents who report drinking alone on their last drinking occasion also is increasing, and more so for girls than boys. Drinking alone is predictive of developing problems with alcohol.

It is common for people to consume alcohol in an effort to cope with stress, sleep disturbances, and even boredom. Beginning in adolescence, females are more likely to suffer from anxiety disorders and depression, increasing the motivation to drink alcohol for temporary relief. Unfortunately, this approach tends to make

The banner features three speakers: Tracy Simpson (VA Puget Sound Healthcare System), Geetanjali Chander, MD, MPH (Johns Hopkins University School of Medicine), and Sherry McKee, PhD (Yale School of Medicine). The event is titled "Innovations in Treating Stress and Trauma in Women With Alcohol Use Disorder" and is scheduled for July 28, 2021, at 12:00-1:00 pm ET. The NIH logo and "National Institute on Alcohol Abuse and Alcoholism" are also present.

NIAAA continues to support research to develop improved alcohol interventions for females and to promote greater awareness of the growing impact of alcohol misuse among women. Recently, NIAAA hosted a [webinar](#) titled *Innovations in Treating Stress and Trauma in Women With Alcohol Use Disorder*. The webinar focused on vulnerable populations—such as women living with HIV and female veterans with military sexual trauma—and included discussions about advances in treatments, such as community partnerships and development of medications targeting stress. The webinar featured NIAAA-supported research conducted by [Geetanjali Chander, M.D. \(Johns Hopkins University School of Medicine\)](#); [Tracy Simpson, Ph.D. \(Veterans Affairs Puget Sound Healthcare System\)](#), and [Sherry McKee, Ph.D. \(Yale School of Medicine\)](#).

problems worse, not better, and increases the risk for AUD and other adverse consequences. Although alcohol temporarily dampens the body's response to stress, feelings of stress and anxiety not only return but worsen once the alcohol wears off. Over time, alcohol misuse can cause adaptations in the brain that intensify the stress response. As a result, drinking alcohol to cope amplifies feelings of stress, anxiety, and depression, and one may end up drinking to fix problems caused by the alcohol itself.

Events such as the 9/11 attacks and Hurricane Katrina showed that stressful situations and anxiety about the future can increase people's drinking and exacerbate symptoms of AUD. Feelings of social isolation and the loss of social support, which are possible side effects of the COVID-19 pandemic, can worsen symptoms of anxiety or depression, and may encourage more alcohol intake. Indeed, the current COVID-19 crisis appears to have fueled increases in retail alcohol sales. For people experiencing stress from unemployment to feelings of isolation during physical distancing, the COVID-19 emergency may be influencing alcohol consumption for many reasons. In several studies, increases in drinking were more likely for women, particularly those reporting increases in stress. Women have been affected more, in a variety of ways, by the pandemic due to increased responsibilities as they care for children and families—often while still working—in addition to the loss of more jobs and income than men, and preexisting differences in pay and in the number of single-parent homes led by women. These stressors are associated with more alcohol use among women.

“It is important that women be aware of these health risks and the *2020–2025 U.S. Dietary Guidelines for Americans*. The Guidelines recommend that women of legal drinking age who choose to drink should limit their intake to 1 drink or less in a day, when alcohol is consumed,” says Dr. Koob. “Drinking less is better for health than drinking more. Some individuals should avoid alcohol completely, such as those who are pregnant or might be pregnant, or people taking medications that could interact negatively with alcohol.”

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## NEWS FROM THE FIELD

## SCIENTISTS DISCOVER BRAIN CELLS THAT COMPETE TO SUSTAIN OR SUPPRESS TRAUMATIC MEMORIES



Two clusters of brain cells compete to promote either the persistence or disappearance of traumatic memories, according to a new study conducted in mice. The findings could provide important insights into human conditions—such as posttraumatic stress disorder (PTSD), anxiety disorders, and associated problems such as alcohol use disorder (AUD)—that can arise from the persistence of traumatic memories. The new research, led by Andrew Holmes, Ph.D., chief of the Laboratory of Behavioral and Genomic Neuroscience at the National Institute on Alcohol Abuse and Alcoholism (NIAAA), and other colleagues in the United States, Switzerland, and Germany, is reported in the journal *Nature*.

For some individuals who experience trauma, fearful responses that are provoked by traumatic memories may continue long-term and affect their ability to engage in everyday activities. These fearful responses may continue even though a person may repeatedly encounter cues associated with the traumatic experience without any harm. The current study sheds light on specific neural circuits that may underlie the persistence and the extinction of fearful memories associated with trauma. The scientists examined clusters of neurons, known as intercalated cells (ITCs), that are packed tightly around the mouse amygdala. The amygdala is found deep within the temporal lobes of mammals' brains and is a hub for processing emotions. It may also play a role in the brain systems that underlie the formation of fearful memories that are associated with certain cues in an individual's environment and the successful extinction of those memories when the same cues later predict no harm.

In a series of behavioral, brain imaging, and neurophysiology studies, the scientists assessed the potential roles of ITCs as mice learned to associate a cue (e.g., a sound) with a foot shock (a fear-inducing event), and then extinguished the association by no longer pairing the cue with a foot shock.

The scientists identified two distinct ITC clusters that promote either a fear response or extinction of the cue/foot shock association. The study further revealed that the clusters effectively compete with one another, through a process known as mutual synaptic inhibition, to determine the relative strength of each memory and, hence, the level of defensive behavior shown by the animal. The study also showed that the ITC clusters have long-range connections to known fear-regulating regions in the midbrain and prefrontal cortex.

These findings identify a neural circuit within the amygdala that orchestrates activity across a broad brain network to exert a powerful influence over the ability to switch between high and low fear states. This result raises interesting questions about whether dysfunction of this brain system could contribute to individual differences in risk for trauma-related psychiatric disorders.

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## NEWS FROM THE FIELD

## LIFE ACHIEVEMENTS LINKED TO SUSTAINED RECOVERY IN NATIONALLY REPRESENTATIVE SURVEY



In a recent study, National Institute on Alcohol Abuse and Alcoholism (NIAAA)-funded researchers at the Recovery Research Institute and Chestnut Health Systems found that many individuals in recovery for alcohol and other substance use disorders report more life achievements, such as increased community engagement and enhanced well-being, as their time in recovery increases. Similar to previous studies, achievements were associated with greater measures of self-esteem, happiness, quality of life, and recovery capital (the internal and external resources that promote and sustain recovery), which is thought to be protective against future relapse. By examining a

nationally representative U.S. sample of individuals in recovery, this study is a helpful step in characterizing how outcomes beyond remission from an alcohol or other substance use disorder may positively affect an individual's ability to maintain long-term recovery.

The researchers analyzed data from a subset of participants enrolled in the [National Recovery Study](#), a survey of non-institutionalized U.S. adults that was managed by the same institutes that published the present study. The survey included questions about previous problems with alcohol or other substances, treatment for and recovery from those problems, and life achievements related to self-improvement, family engagement, and civic and economic participation. A total of 2,002 participants were included in the final analyses.

In addition to greater measures of self-esteem, happiness, quality of life, and recovery capital among survey participants, the researchers found that higher education levels and participation in 12-step programs were related to higher numbers of reported achievements, suggesting that these could be factors associated with sustained recovery.

The research findings suggest that despite the stigma and barriers faced by individuals with alcohol or other substance use disorders, they can recover and experience significant life achievements. Although this research provides important information about how personal successes are linked to recovery, the authors note that additional research is needed. For example, since the design included data from only one time point in recovery, future long-term studies querying participants at different points along their recovery journey could give more direct insight into how the progression of personal achievements affects recovery progression and longevity. Future studies could also delve more deeply into other types of personal achievements and establish a broader understanding of how personal success allows for an accumulation of recovery capital to support long-term recovery.

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## NEWS FROM THE FIELD

## ALCOHOL AND MARIJUANA USE AND MOTIVATIONS AMONG YOUNG ADULTS DURING THE PANDEMIC



Stay-at-home and physical distancing orders during the COVID-19 pandemic have led to increased stress, anxiety, depression, and boredom, and reports suggest that some people may be consuming more alcohol as a coping mechanism. A recent study supported by the National Institute on Alcohol Abuse and Alcoholism now reveals changes in patterns of alcohol and marijuana use during the pandemic, as well as changes in motives for use among young adults.

To assess whether alcohol and marijuana use rates changed during the COVID-19 pandemic, researchers collected and analyzed data from a community sample of 572 young

adults (median age 25) initially recruited in Washington state. The study participants completed standardized online surveys to assess alcohol and marijuana use, perceived social norms of others' use, and motives for use in January 2020, prior to the pandemic. To examine young adults' health and well-being following the implementation of major physical distancing restrictions, participants were invited to complete surveys with the same measures in April and May 2020. The surveys also assessed changes in four categories of motivations for alcohol use: social reasons (e.g., drinking as a social lubricant), conformity (e.g., drinking to fit in), enhancement (e.g., drinking to enhance positive emotions), and coping (e.g., drinking to avoid negative emotions).

The researchers found that, although young adults increased their frequency of alcohol consumption during the pandemic, there was little change in the average amount of alcohol consumed. Compared to consumption before the pandemic, young adults tended to drink on more days but drink less per occasion. No changes in marijuana use were identified.

Findings also indicated that motives for alcohol and marijuana use changed during the pandemic. Motivations to use alcohol for coping with depression increased, while motivations related to coping with anxiety did not change significantly among the study participants. Motivations to use alcohol for social reasons and conformity decreased, as might be expected due to physical distancing restrictions. Motivations related to enhancement also decreased. For marijuana use, boredom-related motives increased, while celebration-related motives decreased, as might be expected during physical distancing restrictions.

Research has shown that depression has increased among young adults during the pandemic. The current study's finding that drinking motives to cope with depression have increased is worrisome, because drinking to cope has been associated with negative consequences, including alcohol use disorder.

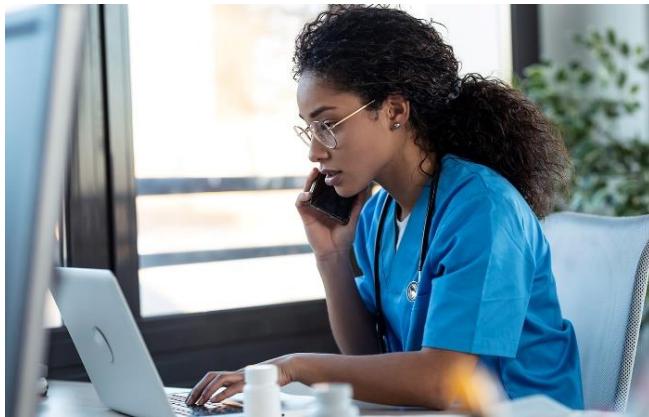
Taken together, these findings provide insight into young adults' alcohol and marijuana use behaviors and motivations, which may inform pandemic-specific interventions or tailoring existing strategies for this unique time.

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A CLOSER LOOK

NIAAA HELPS HEALTHCARE PROFESSIONALS PROVIDE BETTER CARE FOR PATIENTS WHO DRINK TOO MUCH



The National Institute on Alcohol Abuse and Alcoholism (NIAAA) is working on two fronts to help healthcare professionals gain knowledge about alcohol’s impact on health and ways to prevent, detect, and treat alcohol problems in their patients. Later this year, NIAAA plans to launch *The Healthcare Professional’s Core Resource on Alcohol*, which will provide succinct and practical overviews of foundational knowledge about alcohol, the clinical impacts of alcohol, and strategies for preventing and treating alcohol problems. A central Core goal is to help healthcare professionals and practices to overcome known barriers to better care for patients whose alcohol use may be affecting their

health. It will encourage clinicians, for example, to take steps to help surmount the stigma that can interfere with optimum care for patients with alcohol problems, to conduct alcohol screening and brief interventions, and to consider prescribing medications for alcohol use disorder (AUD) when indicated. The Core also will provide many helpful links for a wide range of healthcare professionals to learn more, and it will support these professionals in making changes in their practices.

NIAAA also currently offers [a portal for healthcare professionals](#) on the [NIAAA Alcohol Treatment Navigator website](#), which provides information about AUD treatment options, guidance for making referrals, and resources for alcohol screening, assessment, and treatment with medications. The main goal of the portal is to help clinicians who are not addiction specialists to steer their patients or clients with AUD to providers who offer evidence-based alcohol treatment.

FIVE QUESTIONS WITH...

NANCY DIAZGRANADOS, M.D.

*Deputy Clinical Director, National Institute on Alcohol Abuse and Alcoholism (NIAAA)*



**1** *You are the deputy clinical director for NIAAA’s intramural research program at the National Institutes of Health (NIH) Clinical Center. What factored into your decision to conduct research at the NIH Clinical Center?*

Initially, I trained in the National Institute of Mental Health (NIMH) intramural program, where I learned to love the unique character of the NIH Clinical Center. I believe that the care that patients receive at NIH is among the best in the world. Also, the resources available to NIH physicians are really outstanding, and there are great resources to help our patients. Some of the best doctors and scientists I have met work at the NIH Clinical Center and the NIH intramural program. I really consider it an honor to work among them. Our team at NIAAA has exceptional and dedicated staff, clinicians, and investigators. I am deeply



gratified that our work can make a difference in helping our patients directly at the hospital and indirectly with our study results. I truly feel that I have a dream team at NIAAA.

**2** *How did you choose to work in the field of research on alcohol and other substance use disorders?*

I always felt intrigued by the brain and how it determines who we are, what we feel, and what we do. I went into medicine to study the brain, planning to be a neurologist. However, in medical school I realized that it was psychiatry that had the complexity to study how our brain can make us happy, lose contact with reality, or use a substance compulsively to our own detriment. I worked with mood disorders for years, but I learned to admire the intricacy of alcohol use disorder, or AUD, and how much we need to learn about it. This brought me to NIAAA, where I am looking forward to continuing to study the many sides of AUD. I am sure that by investigating the brain and specifically AUD, we discover many answers, which are always followed by more questions to solve.

**3** *Much of your research has addressed AUD along with co-occurring conditions. Why have you found it important to focus on both?*

Co-occurring conditions, or comorbidities, are what we find among many real-world patients. Usually, patients in our clinic face AUD along with other issues—whether it’s depression, anxiety, or other substance use disorders. In addition, because alcohol misuse can cause damage to many organs, AUD often devastates overall well-being and health. So, I view comorbidities as an extension of the patient’s illness, not as a separate construct that must be isolated or avoided. I believe it is part of our work to understand the full complexity of AUD and address how alcohol-related problems can impact every aspect of a person’s health.

**4** *Looking ahead, what do you consider to be some of the major challenges in the field of clinical research on AUD?*

Some of the challenges stem from AUD’s all-encompassing nature, as I mentioned earlier. Our patients often present with mood and anxiety symptoms, severe insomnia, liver disease, and heart damage, among other problems. They usually smoke or use other substances. Also, many people with AUD can be stigmatized and feel isolated. Our patients often report having strained relationships or that they’ve lost all social support due to conflicts at work, school, or home. Many face unemployment or homelessness as a consequence of AUD-related problems. They are among the most complex patients I have treated. At NIAAA we take a team approach in working with participants in our clinical studies; we aim to untangle the complexity of their illness. The team approach is very beneficial to effective treatment.

**5** *Clearly your work keeps you busy! But when you’re not seeing patients in the clinic, or working in the laboratory, or writing scientific papers, what do you do for fun?*

I love reading, and I read compulsively! I also love painting. I painted in watercolors and oils for years, although I am not painting as much as I did in the past. Now, most of my free time is spent with my dog and foster dogs. I adopted a greyhound and fell in love with the breed. This led me to foster greyhounds who “retired” from the racetrack. I help get them ready for life as pets. My most recent foster greyhound was just adopted, and there is a great satisfaction in finding the right family for a dog. It is very sweet to hear “pupdates” from my foster dogs being loved and loving their families.

