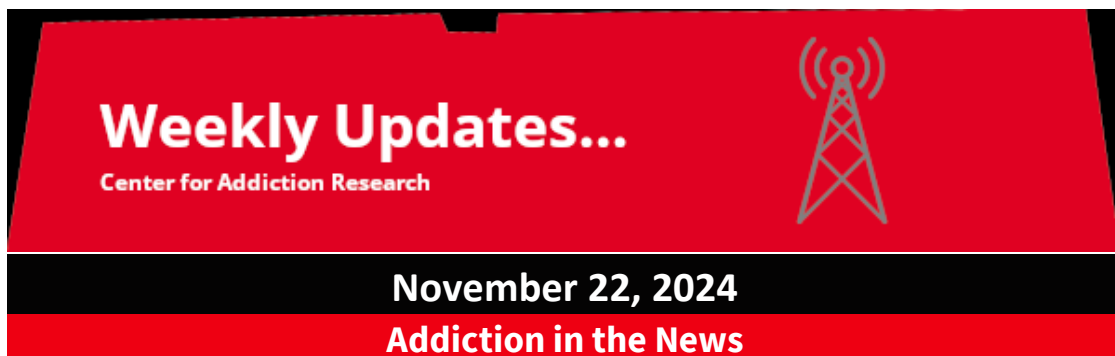


Welcome to the weekly newsletter from the Center for Addiction Research! Each newsletter includes highlights from addiction in the news topics, active funding opportunities offered by NIDA/NIAAA, and information about any new publications from CAR members. Please email Jen Rowe ([roweji@ucmail.uc.edu](mailto:roweji@ucmail.uc.edu)) to change your communication preferences. **Please note that the next weekly newsletter will be published Friday, December 6.** Thank you.

Thank you for your interest in the Center for Addiction Research - our mission is to accelerate scientific progress in the prevention and treatment of substance use disorders and their consequences by fostering research collaborations across: 1) UC departments, colleges, and centers including Cincinnati Children's Hospital Medical Center; 2) Local, regional, and state community and governmental partners; and 3) Other academic institutions and industry."



## **UC/ Regional News**

### **New Decision Tool to Help Communities Identify Overdose Reduction Strategies Launched**

The Overdose Crisis Community Decision Tool, developed through the National Institutes of Health's HEALing Communities Study (HCS), is a free, web-based resource created to support community leaders in identifying evidence-based strategies proven to reduce overdose deaths. By answering a short survey, users receive a customized list of science-backed solutions and recommendations tailored to meet the needs of their community's specific goals, resources, and capacities. Strategies are drawn from the Overdose Reduction Continuum of Care Approach (ORRCA) menu, which was developed and tested in 65 communities across Kentucky, Massachusetts, New York, and Ohio that participated in the HCS. The tool offers practical guidance, examples of successful overdose reduction strategies applied in HCS-participating communities, and resources on how the strategies can be replicated. Whether you are an elected official, decision-maker, community coalition member, local leader, or an advocate looking for ways to support your community, this tool offers a starting point to identify sustainable, life-saving solutions. No technical expertise or prior data is required, nor does the tool collect identifying information such as geographic location. The survey takes approximately 5-10 minutes to complete. **(Dr. T. John Winhusen, HEALing Communities Study Co-Principal Investigator for Ohio and CAR Director)**

## **Governor DeWine Announces \$100 Million in Federal Funding to Fight Opioid Use, Prevent Overdose Deaths in Ohio**

(COLUMBUS, Ohio)—Ohio Governor Mike DeWine and Ohio Department of Mental Health and Addiction Services (OhioMHAS) Director LeeAnne Cornyn today announced the award of \$100 million in federal grant funding that will be used in communities across the state to advance ongoing efforts to fight opioid use disorder and prevent overdose deaths. This marks the fourth round of State Opioid and Stimulant Response (SOS) grant funds awarded throughout Ohio. These SOS 4.0 grants were received by OhioMHAS through the federal Substance Abuse and Mental Health Services Administration (SAMHSA) to support local organizations...

## **More marijuana taxes coming to Ohio, local governments thanks to high demand in budding industry**

COLUMBUS, Ohio - In the three months since legal recreational marijuana sales began in Ohio, \$15.5 million has been collected for state and local governments from an extra tax on marijuana. Between Aug. 6 and Saturday, recreational dispensary customers have spent just over \$155 million on product, according to the Ohio Division of Cannabis Control. Customers pay 10% taxes on products at the cash register, according to the law voters passed in 2023 legalizing cannabis for adult use. Those collections are on top of existing sales taxes. According to the statute, the taxes go to several accounts in the state treasury, including: - 36%...

## **Ohio's Unregulated Intoxicating Hemp Products Raise Concerns Among Policymakers and Health Officials**

Columbus, OH — November 12, 2024 — Ohio is one of 21 states where intoxicating hemp products, such as delta-8 THC gummies, are legal but remain largely unregulated, raising growing concerns about public health, consumer safety, and youth access. A new report from Ohio State University's Drug Enforcement Policy Center (DEPC) outlines these concerns and proposes several regulatory measures to address the issue. The report, which was released on November 12, highlights the increasing prevalence of these hemp-derived products and the potential risks they pose, from the safety and quality of products sold in stores...

## **CLIMB-Health program aims to help those in recovery into career pathway**

A statewide program in Kentucky aims to provide credentialing and pathways to a career in social work for people in substance use disorder recovery. Advocates say the Career Ladders in Mental and Behavioral Health or CLIMB-Health program is vital for the state to boost the mental health and social services workforce. Carl Wilson, senior fellow for healthcare development and initiatives with the Kentucky Council on Secondary Education, said it also provides opportunities for those in recovery to make a living and expand their career horizons. "You can gain both occupation credentials and or employment all the way up through a...

### **Study highlights success in national smoking assessment program**

A new University of Kentucky Markey Cancer Center study highlights the success of the largest-ever quality improvement initiative to focus on the critically important issue of smoking among cancer patients. The study, led by UK Markey Cancer Center researcher Jessica Burris, Ph.D., and published in the Journal of Clinical Oncology Nov. 19, analyzed outcomes from the American College of Surgeons' (ACS) "Just Ask" quality improvement program. The initiative, led by Timothy Mullett, M.D., Markey Cancer Center surgeon and former chair of the ACS Commission on Cancer, was implemented at 762 cancer care facilities...

## **National News**

### **U.S. Alcohol-Linked Deaths Doubled in 20 Years**

TUESDAY, Nov. 19, 2024 (HealthDay News) -- Alcohol-related deaths have surged in the United States, nearly doubling over 20 years, and a growing number of victims are women, a new study warns. "Our study found significant gender differences in alcohol-related [death rates]," said senior author Yiota Kitsantas, head of population health and social medicine at the Florida Atlantic University (FAU) College of Medicine. "While men had higher overall death rates, women experienced a larger relative increase, which may reflect changing social norms and the alcohol industry's increased targeting of women through marketing..."

### **GLP-1 Drugs Could Help People With Alcohol Use Disorder**

Some GLP-1 receptor agonists may hold promise as treatments for alcohol use disorder (AUD), a Swedish observational study suggested. Among more than 200,000 individuals with AUD, those taking semaglutide (Ozempic, Wegovy) had a 36% reduced risk for AUD-related hospitalization compared with those not taking a GLP-1 agent (adjusted hazard ratio [aHR] 0.64, 95% CI 0.50-0.83), Markku Lähteenvuo, MD, PhD, of the University of Eastern Finland in Kuopio, and colleagues reported. The GLP-1 agonist liraglutide (Victoza, Saxenda) was also linked with a significantly reduced risk of AUD hospitalization (aHR 0.72, 95%...

### **Study identifies pregnant women at risk for substance use**

Use of tobacco, alcohol, cannabis, and illicit drugs is dangerous in pregnancy, increasing risks of stroke, miscarriage, preterm delivery, low birth weight and infant neurodevelopmental problems. Yet according to the 2020 National Survey of Drug Use and Health, more than 20% of pregnant women in the United States report using one or more of these substances. Public health experts agree on the need to identify pregnant women who are most vulnerable to using harmful substances. A new study published in the Journal of Addiction Medicine conducted by a team of Stony Brook University researchers used the PROMOTE...

### **Genes and proteins linked to different types of alcohol use disorders could provide new therapeutic targets**

A team of medical researchers at the National Institute on Alcohol Abuse and Alcoholism has identified some of the genes and proteins associated with alcohol use disorders. In their project reported in the journal *Nature Human Behaviour*, the group studied gene expression in brain cells and compared it with data from prior studies to learn more about why consumption of alcohol impacts people differently. Prior research and anecdotal evidence have shown that not only do people have different alcohol consumption habits, but they behave differently after consumption. In new research, the team focused only on...

### **Scientists discover atypical brain connectivity in those with alcohol use disorder**

In a recent study published in *Translational Psychiatry*, researchers discovered distinct patterns in how brain regions communicate in individuals with alcohol use disorder compared to healthy individuals. Using advanced imaging and analytical techniques, the study found altered connections in specific brain areas related to self-control, decision-making, and reward processing. These changes, they suggest, could explain why some people develop alcohol use disorder and struggle to control their alcohol intake. The study aimed to clarify how different parts of the brain interact in alcohol use disorder. Alcohol misuse...

### **Why We're Drinking More: The Pandemic's Lasting Effect on Alcohol**

Alcohol use among U.S. adults escalated during the COVID-19 pandemic and remained elevated afterwards, reveals a recent study. Stress from the pandemic and limited access to healthcare services were seen as major contributors to the continued rise in drinking levels, underscoring the necessity for targeted health and policy interventions. A population-based study of adults aged 18 and older revealed a significant rise in alcohol use during the COVID-19 pandemic, with levels remaining high even after the pandemic. This trend raises serious public health concerns and highlights the need for new policies and health care...

### **Early adult binge drinking has lasting impact on aging brain in mice**

Binge drinking in early adults can lead to long-lasting and potentially permanent dysregulation in the brain, according to a new study in mice, led by researchers at Penn State. They found that neurons, cells that transmit information in the brain via electrical and chemical signals, showed changes following binge drinking were similar in many ways to those seen with cognitive decline. These findings, published in the journal *Neurobiology of Aging*, reveal that binge drinking early in life may have lasting impacts that are predictive of future health issues, like Alzheimer's disease and related dementias, the researchers...

### **Exposure to marijuana in the womb may increase risk of addiction to opioids later in life, study finds**

With the increased legalization of recreational cannabis, as many as 1 in 5 pregnant women in the U.S. are now using the drug to help with morning sickness, lower back pain or anxiety. Evidence has been growing, however, to suggest that tetrahydrocannabinol (THC), the main psychoactive ingredient in cannabis, poses risks to the developing fetus by impacting brain development. Now a new study finds that this could increase the risk of addiction to opioids later in life. The preclinical animal study, led by researchers at the University of Maryland School of Medicine, was published in the journal *Science Advances*. It found that...

### **Study finds cannabis-users would reduce use the most for job interviews, caring for children**

People who use cannabis at least once a month may consume the drug before low-stakes activities, but what if they had other responsibilities, such as taking care of their children? That question was at the center of a study recently published by a diverse team of authors at the Cofrin Logan Center for Addiction Research and Treatment and Brown University. The researchers explored how next-day responsibilities affected choices about cannabis consumption among 177 adults. The research, "Exploring the suitability of cannabis use with next-day responsibilities: A behavioral-economic and qualitative study," was published...

### **Research claims cannabis use can cause chromosomal damage, increasing cancer risk and harming offspring**

Cannabis use causes cellular damage that increases the risk of highly cancerous tumors, according to a paper published in *Addiction Biology*. The paper describes cannabis as a "genotoxic" substance because it damages a cell's genetic information, which can lead to DNA mutations, accelerated aging, and cancer. To make matters worse, this genotoxicity may be transmitted via damaged egg and sperm to the cannabis user's offspring, making the risk of cannabis use trans-generational. In a publication in *Addiction Biology* researchers from The University of Western Australia have made a link between established knowledge...

### **Here's what happens when a school is located near a cannabis dispensary**

As more states legalize marijuana, researchers are examining the effects of legalization on society. Angus Kittelman, an assistant professor of special education at the University of Missouri-Columbia, and Gulcan Cil, a senior statistician at Oregon Health & Science University, decided to look at the effects of cannabis dispensaries being located near schools. They discuss their research in the following Q&A with education editor Jamaal Abdul-Alim. Is it bad when a school is located near a dispensary? Yes, it's not good for a couple of reasons. When cannabis dispensaries are near middle schools, students are more likely to...

### **What are the lessons from America's great cannabis liberalization experiment?**

The US has come quite some way in legalizing cannabis use, with nearly half of states having laws permitting recreational cannabis use. Yet the legalization of cannabis remains an ever-present, heated and polarizing debate. One that is often exploited by politicians to win votes, either by stoking fear of the harms that will come from legalizing cannabis, or by the promise of decreased violent crime and increased tax revenue from cannabis sales. The science around the harms of cannabis is relatively well-established. Frequent use of high-potency cannabis and starting use at a young age is a risk factor for various mental health...

### **Surgeon general says U.S. smoking rates have tumbled, but not for everyone**

Although the United States has made significant headway in curbing cigarette smoking and secondhand smoke exposure, a new report finds deep divisions remain and they run along predictable fault lines. Disparities in tobacco use continue to persist by income and occupation, geography, education, race and ethnicity, sexual orientation and gender and mental health status, the new data from the U.S. surgeon general found. Nearly one in five deaths nationwide—almost 500,000 a year—are still due to cigarette smoking and exposure to secondhand smoke. "Tobacco use continues to decline. Americans increasingly...

### **Kids Still Find It Easy to Buy Flavored Vapes Online**

TUESDAY, Nov. 12, 2024 (HealthDay News) -- If you think that federal restrictions on the sale of tobacco products make it nearly impossible for your teen to buy vapes online, new research suggests you're mistaken. In 2020, the Preventing Online Sales of E-Cigarettes to Children Act banned e-cigarettes and vaping products from being shipped through the U.S. Postal Service and introduced an ID scan requirement to accept deliveries of such items. But while sales of flavored tobacco products have been restricted in eight states and nearly 400 cities or counties, those regulations don't fully cover online shopping, researchers...

### **Data suggest smokers who switch to vaping see improved respiratory health**

A paper in *Nicotine and Tobacco Research* finds that people who switch from smoking cigarettes to vaping see improved respiratory health, but people who begin consuming electronic cigarettes while continuing to smoke regular cigarettes do not report improved respiratory symptoms. The paper is titled "Association of cigarette–e-cigarette transitions with respiratory symptom resolution." Adults increasingly use electronic cigarettes to try to quit smoking because of the perceived reduced risk. But while vaping reduces exposure to toxic chemicals, it has been unclear whether switching from cigarettes to e-cigarettes...

### **Opioid overdose deaths drop for 12th straight month, now lowest since 2020**

Opioid overdose deaths have now slowed to the lowest levels nationwide since 2020, according to new estimates from the Centers for Disease Control and Prevention. This marks the 12th straight month of decline since a peak last year.

Around 70,655 deaths linked to opioids like heroin and fentanyl were reported for the year ending June 2024, the CDC now estimates, falling 18% from the same time in 2023. Almost all states, except for a handful in the West from Alaska through Nevada, are now seeing a significant decrease in overdose death rates. Early data from Canada also suggests overdose deaths there might now...

### **Improving community engagement in addiction science**

Medical research can sometimes become disconnected from the interests and needs of the people it is intended to serve. This is true across diseases and disorders, and addiction research is no exception. Too often, scientists who study drugs and addiction have not meaningfully engaged people with lived and living experience of substance use. And when people who use substances are engaged, the experience may leave them feeling exploited or traumatized, such as when they are not adequately compensated for their time or when they are asked to recall distressing life events. It is also rare for researchers to follow up...

### **Dr. Nora Volkow shares insights on addiction science and harm reduction in Genomic Press interview**

Bethesda, Maryland, USA, 7 November 2024 – Dr. Nora Volkow's mission to revolutionize addiction treatment began with a deeply personal observation: watching how excessive substance use could profoundly alter a person's behavior while simultaneously triggering social rejection by others. As the first woman and Hispanic Director of the National Institutes of Health's National Institute on Drug Abuse (NIDA), Dr. Volkow has dedicated her career to investigating how drugs affect the human brain and how these disruptions contribute to the behavioral/emotional changes in addiction; knowledge that has cemented the...

### **The solution to death from a fentanyl overdose could lie in its chemical structure**

Over the past few decades, the opioid epidemic has gripped the United States, fueled in large part by the over-prescription of pain-relieving drugs like oxycodone. As those pharmaceuticals were made more difficult to obtain, opioids such as heroin and fentanyl began new waves of the epidemic and more deaths from overdose. Fentanyl and its cousins, known as fentalogs (fentanyl analogs) are particularly dangerous—just 2 milligrams can prove lethal. All of these drugs act at the mu-opioid receptor, which is responsible for their pain relieving properties as well as their addictive and lethal properties. University...

### **Stalemate breaks on telehealth prescriptions of stimulants and addiction treatment**

Federal officials on Friday said health providers could prescribe drugs for opioid addiction and ADHD over telehealth for one more year, ending a months-long stalemate among policymakers. During the pandemic, the Drug Enforcement Agency issued temporary rules that allowed providers to prescribe controlled

substances like buprenorphine and Adderall without first meeting a patient in person. Those rules were set to expire on Jan. 1, and have now been extended until the end of 2025. The extension kicks the resolution of a years-long debate — one that has already elicited nearly 40,000 comments on earlier proposed...

### **The recovery community says it offers refuge from opioid addiction. But it's still hostile to lifesaving addiction medications**

The last time Mark Palinski went to a Narcotics Anonymous meeting, he was asked to leave and never come back. He stills remembers the argument: All he had done was advocate for the use of the “gold standard” treatment for opioid addiction, a common medication called buprenorphine. To Palinski, buprenorphine is a godsend. It helped him finally beat opioid addiction decades after he was prescribed Vicodin for a schoolyard kickball accident, leaving him hooked on painkillers at age 11. Buprenorphine, often known by the brand name Suboxone, is regulated, safe, and available for pickup at his local pharmacy. And instead...

### **National survey shows millions of Americans hurt by others' drinking, drug use**

The risks of alcohol and other drug consumption to the user are well known, but many Americans—nearly 160 million—say they've been harmed by someone else's substance use, according to a new study in the Journal of Studies on Alcohol and Drugs. In a national survey of U.S. adults, researchers found that 34% said they'd ever suffered "secondhand harm" from someone else's alcohol use—ranging from marriage and family problems to financial fall-out to being assaulted or injured in a drunk-driving accident. Meanwhile, 14% said they'd been harmed by someone else's use of marijuana, opioids or other drugs. In sheer numbers...

### **Impaired caregivers, bed sharing raise risk of sudden unexplained death in infants with prenatal drug exposure**

Babies who are prenatally exposed to illicit drugs or alcohol are known to be at higher risk for sudden unexpected infant death (SUID). A new study by a Nemours Children's Health researcher, published in Pediatrics, shows that caregivers of prenatally exposed infants were twice as likely to be impaired at the time of death. "As the drug epidemic continues in the United States, about 8% of births are affected by prenatal exposure to illicit drugs," explained lead author Stephanie A. Deutsch, MD, MS, Director of the Nemours CARE (Children at Risk Evaluation) Program at Nemours Children's Health, Delaware Valley. "These infants...

### **Excessive social media use tied to substance experimentation in US pre-teens**

As teens continue to spend more time on screens and social media, a new study finds that among 11-12-year-olds, excessive time online is associated with early experimentation with substances like alcohol, nicotine, and cannabis. Published in Drug and Alcohol Dependence, the study shows that adolescents who spend more time on social media, texting, and video chatting are more likely to experiment with alcohol, nicotine, or cannabis one year later. In contrast, time spent on other types



of screen activities—such as video gaming, browsing the internet, or watching TV, movies, or videos—was not linked to the same risks. "Our...

### **Despite federal warnings, kratom still readily available across US**

Nearly three-fourths of tobacco and vape stores in the United States sell an addictive, dangerous substance with connections to liver toxicity, seizures and death, according to a new study from the University of Mississippi. That's a key finding of a recent study on the availability of kratom, published in the American Journal of Public Health. Kratom is a tree native to Southeast Asia and its leaves have been used as a stimulant and for pain management for hundreds of years. More than 2 million people in the United States use kratom annually. The Drug Enforcement Administration briefly classified kratom as...

## **Funding Opportunities**



## **GRANTS & FUNDING**

NIH Central Resource for Grants and Funding Information

[PAR-25-240](#)

[Tobacco, Alcohol, and Cannabis Policy Research for Health Equity \(R01 Clinical Trial Optional\)](#)

[PAR-25-241](#)

[Tobacco, Alcohol, and Cannabis Policy Research for Health Equity \(R21 Clinical Trial Optional\)](#)

[PAR-25-204](#)

[NIDA Research Education Program for Clinical Researchers and Clinicians \(R25 Clinical Trial Not Allowed\)](#)

[PAR-25-110](#)

[Translational Research in Maternal and Pediatric Pharmacology and Therapeutics \(R01 Clinical Trial Optional\)](#)

[PAR-25-111](#)

[Translational Research in Maternal and Pediatric Pharmacology and Therapeutics \(R21 Clinical Trial Optional\)](#)

[RFA-DA-26-034](#)

[Chemical Countermeasures Research Program \(CCRP\) Initiative: Basic Research on](#)

[The Deleterious Effects of Acute Exposure to Ultra-Potent Synthetic \(UPS\) Opioids \(R01 Clinical Trial Not Allowed\)](#)

[NOT-AA-24-014](#)

[Notice of Intent to Publish a Funding Opportunity Announcement for Investigational New Drug \(IND\)-enabling and Early-Stage Development of Medications to Treat Alcohol Use disorder and Alcohol-Associated Organ Damage \(R41/R42 Clinical Trial Optional\)](#)

[NOT-AA-24-015](#)

[Notice of Intent to Publish a Funding Opportunity Announcement for Investigational New Drug \(IND\)-enabling and Early-Stage Development of Medications to Treat Alcohol Use disorder and Alcohol-Associated Organ Damage \(R43/R44 Clinical Trial Optional\)](#)

[NOT-DA-24-058](#)

[Notice of Change to RFA-DA-26-018, RFA-DA-26-019, Addressing Challenges in Detecting New Drugs: Instrumentation for Alternative Analytical Methods \(R41/R42 - Clinical Trials Optional\) and \(R43/R44 - Clinical Trials Optional\)](#)

### **UC Foundation Funding Opportunity**

Please contact Carol Russell at (513) 556-6169 or [carol.russell@uc.edu](mailto:carol.russell@uc.edu) **at least 5 business days before the deadline**, prior to applying to the below opportunity, to ensure coordination and to facilitate assistance with approaches.

### **American Psychological Association to Name Congressional Fellows**

**Deadline: January 2, 2024**

The American Psychological Association (APA) invites applications for the APA Congressional Fellowship, which aims to provide psychologists with an invaluable public policy learning experience, to contribute to the more effective use of psychological knowledge in government, and to broaden awareness about the value of psychology-government interaction among psychologists and within the federal government. APA and American Psychological Foundation (APF) will sponsor up to three congressional fellows for a one-year appointment beginning approximately August 30, 2025. Stipends for these fellowships range from \$75,000 to \$90,000, depending upon years of postdoctoral experience. In addition, the fellowship provides reimbursement for health insurance coverage and a \$3,750 stipend for professional development and relocation expenses during the fellowship year. Fellows spend a year working on the staff of a member of Congress or congressional committee. Activities may involve drafting legislation, conducting oversight work, assisting with congressional hearings and events, and preparing briefs and speeches. Fellows also attend a two-week orientation program on congressional and executive branch operations, which provides guidance for the congressional placement process, and participate in a yearlong seminar series on

science and public policy issues. The American Association for the Advancement of Science (AAAS) administers these professional development activities for the APA fellows and for fellows sponsored by over two dozen other professional societies. The APF Jacquelin Goldman Congressional Fellowship was created to support psychologists with a background in developmental or clinical psychology and experience working directly with children. The APF Springfield LGBTQIA+ Policy Congressional Fellowship was created to support psychologists with a background or interest in LGBTQIA+ populations. Open to all full APA members, applicants must be a psychologist and a U.S. citizen and have a doctorate in psychology (from an APA-accredited doctoral program and internship if in the area of professional psychology) or related field by the application deadline.

## CAR Member New Publications

### **Artificial intelligence-based drug repurposing with electronic health record clinical corroboration: A case for ketamine as a potential treatment for amphetamine-type stimulant use disorder**

Zhenxiang Gao, T John Winhusen, Maria P Gorenflo, Ian Dorney, Udi E Ghitza, David C Kaelber, Rong Xu

*Addiction*

DOI: <https://doi.org/10.1111/add.16715>

#### **ABSTRACT**

**Background and Aims:** Amphetamine-type stimulants are the second-most used illicit drugs globally, yet there are no US Food and Drug Administration (FDA)-approved treatments for amphetamine-type stimulant use disorders (ATSUD). The aim of this study was to utilize a drug discovery framework that integrates artificial intelligence (AI)-based drug prediction, clinical corroboration and mechanism of action analysis to identify FDA-approved drugs that can be repurposed for treating ATSUD.

**Design and Setting:** An AI-based knowledge graph model was first utilized to prioritize FDA-approved drugs in their potential efficacy for treating ATSUD. Among the top 10 ranked candidate drugs, ketamine represented a novel candidate with few studies examining its effects on ATSUD. We therefore conducted a retrospective cohort study to assess the association between ketamine and ATSUD remission using US electronic health record (EHR) data. Finally, we analyzed the potential mechanisms of action of ketamine in the context of ATSUD.

**Participants and measurements:** ATSUD patients who received anesthesia (n = 3663) or were diagnosed with depression (n = 4328) between January 2019 and June 2022. The outcome measure was the diagnosis of ATSUD remission within one year of the drug prescription.

**Findings:** Ketamine for anesthesia in ATSUD patients was associated with greater ATSUD remission compared with other anesthetics: hazard ratio (HR) = 1.58, 95% confidence interval (CI) = 1.15-2.17. Similar results were found for ATSUD patients with depression when comparing ketamine with antidepressants and bupropion/mirtazapine with HRs of 1.51 (95% CI = 1.14-2.01) and 1.68 (95% CI = 1.18-2.38), respectively. Functional analyses demonstrated that ketamine targets several ATSUD-associated pathways including neuroactive ligand-receptor interaction and amphetamine addiction.

**Conclusions:** There appears to be an association between clinician-prescribed ketamine and higher remission rates in patients with amphetamine-type stimulant use disorders.

**Keywords:** artificial intelligence; drug discovery; drug repurposing; electronic health records; ketamine; stimulant use disorder

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