

Welcome to the Biannual Bulletin from the Center for Addiction Research! The biannual bulletin contains news stories and summaries provided by CAR members about the great work they are doing. Thank you to those who shared stories for this edition! To have your work included in the next issue, coming in late January 2025, please send a brief summary/story accompanied by pictures or graphics (if available) to Jen Rowe (roweji@ucmail.uc.edu) any time prior to January 15th. Thank you!

CAR Biannual Bulletin

July 2024

Member Research Updates

2025 Next Bulletin Release Date:
- Late January

2025 Next Deadline for Submitting Stories:
- January 15th

Register Now! Center for Addiction Research Summer Speaker Series, final session, Wednesday, August 14, 202 at 12:00 PM, featuring Dr. Kathy Burlew and Dr. Simeon Goodwin, "Social and Psychosocial Determinants of Treatment Response and Recovery Among Black Adults Who Use Substances." Sponsored by: Center for Clinical & Translational Science & Training

Legacy of federal opioid intervention: communities equipped to act HEALing Communities Study developed guidance on evidence-based practices



A national effort to reduce opioid-related overdose deaths has laid the groundwork for more widely available opioid use disorder treatment, safer prescribing practices, and community-based overdose education and naloxone distribution that can save lives, according to researchers who led Ohio's participation in the initiative.

Launched in 2019, the HEALing (Helping to End Addiction Long-Term) Communities Study (HCS) is the largest addiction prevention and treatment implementation study ever conducted. Researchers from the four participating states report June 16 in the *New England Journal of Medicine* and at the College on Problems of Drug Dependence (CPDD) annual meeting that there was not a statistically significant reduction in opioid overdose death rate during the evaluation period.

The data-driven intervention deployed evidence-based practices in 67 communities across states hit hard by the opioid crisis: Kentucky, Massachusetts, New York and Ohio. Though the goal to significantly reduce opioid overdose deaths was not met, Ohio implemented 137 evidence-based practice strategies in nine counties in Ohio. These strategies, implemented in complicated settings – hospital emergency departments and jails, to name just two – was an accomplishment that will have enduring positive effects, researchers say.

T. John Winhusen, PhD, the HCS co-principal investigator for Ohio and director of the University of Cincinnati Center for Addiction Research, led the national group of experts convened to develop the Opioid-Overdose Reduction Continuum of Care Approach (ORCCA), a compendium of evidence-based practice strategies that guided the selection of interventions to be implemented in HCS intervention communities.

ORCCA includes three “menus” of evidence-based practices: one devoted to overdose education and naloxone distribution, one focused on increasing

exposure to medication for opioid use disorder, and a third focused on safer opioid prescribing.

“ORCCA was designed to be flexible enough to meet the needs of a given community while also ensuring that strategies known to reduce opioid-related overdose deaths would be selected for implementation,” said Winhusen, also the Donald C. Harrison Endowed Chair in Medicine and professor and vice chair for addiction sciences in the Department of Psychiatry and Behavioral Neurosciences at UC.

“Implementing all of those evidence-based practices is the success,” said Bridget Freisthler, PhD, professor of social work at The Ohio State University and Ohio’s principal investigator for the HEALing Communities Study. “The practices are really about changing clinical care. The fact that many of those services are in place and are still working gives us some confidence that, going forward, these communities are going to be better prepared to address overdoses and overdose deaths. And hopefully they’ll see reductions over time.”

The National Institutes of Health (NIH) launched the four-year, multisite HCS to test a set of interventions for reducing overdose deaths across health care, justice and behavioral health settings. Over 100,000 people die annually of a drug overdose – 75% of which involve an opioid, according to the Centers for Disease Control and Prevention. Numerous evidence-based practices have been proven to prevent or reverse opioid overdose, but are gravely underused due to numerous barriers, according to the National Institute on Drug Abuse (NIDA).

Between January 2020 and June 2022, intervention communities successfully implemented 615 evidence-based practice strategies to address opioid-related overdose deaths – but only 235 were implemented before the study period comparing outcomes in intervention and control communities began. The authors of the NEJM article noted the COVID-19 pandemic, a short timeframe for implementing the interventions, and increased prevalence of fentanyl in the illicit drug market may have diminished the mortality impact of the intervention.

The evidence-based practices compiled for the ORCCA covered a lot of ground and required a lot of coordination to launch.

“Some of the strategies were major undertakings,” Winhusen said. “For example, working with a jail to start a buprenorphine treatment program is one strategy out of the 137 strategies implemented in Ohio. Another example was working with emergency departments to identify people with opioid use disorder, get them started on buprenorphine, and link them to ongoing buprenorphine treatment.

“Due to both COVID-19 and time constraints, only 38% of the strategies were implemented before the start of the comparison period so you’re not going to see the full effects. It just wasn’t enough time.”

Freisthler co-led the charge to engage community coalitions and help them consult data to select interventions best suited to the areas they served. The team also developed communications campaigns addressing a range of topics – the stigma linked to opioid misuse and to taking medications to combat opioid addiction, and the necessity of adopting evidence-based practices – that were among written materials that will help sustain Ohio’s participation in the initiative, all housed on an Ohio State HCS website.

“Communities have been at the forefront of addressing opioid use and overdoses for years. A success of Ohio’s implementation is peer-to-peer learning and feedback about the evidence-based practice strategies. This effort moved the needle and what had been barriers to services in the past,” she said. “It takes a coordinated effort, and some might need help and

expertise, but really, that piece showed that communities can be an agent of change in this process.”

The Ohio consortium brought together experts from Ohio State, UC and four other universities – Case Western Reserve University, Ohio University, University of Toledo and Wright State University – as well as the community organizations and leaders from state agencies.

Freisthler noted that ongoing engagement with the RecoveryOhio multi-agency initiative created by Gov. Mike DeWine was an enabling force behind many features of the HEALing Communities Study, including establishment of the State of Ohio Integrated Behavioral Health Dashboard of county statistics and trend data, as well as streamlined navigation of policy and communication challenges over the course of the study.

Many U.S. states have access to national opioid settlement funds specifically designated to address the opioid epidemic. Winhusen said that several free products developed from the Opioid Overdose Reduction Continuum of Care Approach, including a practice guide and a guide for policymakers, are “perfect for communities that are trying to decide how to wisely invest their opioid settlement dollars.”

“Back in 2019, the four states convened top experts to discuss the scientific literature in order to develop this,” he said. “A great deal of time and effort went into reaching consensus on the strategies included in the ORCCA, and we would love to see communities use this resource to determine how best to invest their opioid settlement funds.”

**Read a related article from UC News by Tim Tedeschi:
[Study aimed at reducing opioid overdose deaths presents results](#)**

Read the study published in the journal [New England Journal of Medicine](#)

White House Drug Policy director visited UC

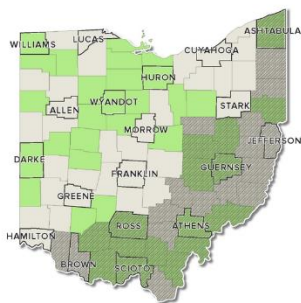


Rahul Gupta, MD, director of the White House Office of National Drug Control Policy, visited the College of Medicine while he was in Cincinnati Feb. 22 to learn more about the efforts of the college and UC Health to assist those dealing with opioid and drug overdoses and abuse and hear about ongoing research. Gupta and several staff members met with Dan Bebo, MD, associate professor, Department of Psychiatry and Behavioral Neuroscience; **Caroline Freiermuth, MD [CAR Population Health and Health Services Core Co-Leader and CAR Member]**, Class of 2006, Shawn Ryan Endowed Chair to Benefit the Acute Treatment of Mental Health and Substance Use Disorders, Department of Emergency Medicine; Melissa Delbello, MD, Dr. Stanley and Mickey Kaplan Endowed Chair in Psychiatry, Department of Psychiatry and Behavioral Neuroscience; **T. John Winhusen, PhD**, Donald C. Harrison Endowed Chair in Medicine, vice chair of Addiction Sciences in the Department of Psychiatry and Behavioral Neuroscience and **director of the Center for Addiction Research**; Richard Ryan, MD, professor and vice chair of operations, Department of Emergency Medicine; **Andrew Norman, PhD [CAR Addiction Treatment Development and Testing Core Leader and CAR Member]**, professor, Department of Pharmacology and Systems Physiology; and Brett Kissela, MD, MS, executive vice dean and chair and Albert Barnes Voorheis Professor of Neurology, Department of Neurology and Rehabilitation Medicine.

**Read the press release linked below:
[In Support of President Biden’s Unity Agenda, White House Drug Policy Director Travels to Ohio to Discuss Efforts to Address the Overdose Epidemic and Save Lives](#)**

Hamilton County, OH Advances Treatment for Opioid Use Disorder in Jail

Ohio Healing Communities Study



In Hamilton County, Ohio, 76% of the people who overdosed in 2021 had a history of incarceration at the Hamilton County Justice Center (HCJC), the county jail. In response to this, the HCJC launched a medication for opioid use disorder (MOUD) program, with input from the HCS Intervention Design Team, technical experts, and input from other jurisdictions with MOUD programs, including Kenton County, KY jail and Cuyahoga County, OH jail.

Research shows that starting medications for opioid use disorder (MOUD) prior to release and continuing them during reentry reduces the risk of overdose death by 75%. The HCJC model includes induction of MOUD for individuals with an opioid use disorder (OUD) and utilization of peer recovery supporters and licensed chemical dependency counselors to assist individuals upon release. *The key community partners in operationalizing the MOUD programs were Sheriff Charmaine McGuffey, NaphCare, Addiction Services Council, Hamilton County Mental Health & Recovery Services Board, and Talbert House.*

A comprehensive MOUD approach

Using a chronic-care approach, HCJC’s MOUD program provides incarcerated individuals with OUD with an opportunity to begin MOUD treatment during their incarceration or to continue their medications if previously inducted in the community. When an individual enters the HCJC, they are screened for treatment eligibility and substance use. Staff in the MOUD program are members of the internal addiction response team, a MOUD nurse, the Sheriff’s Command Staff, an Addiction Services Coordinator, pretrial service staff, and a peer mentor. “The Sheriff and key leadership across the county came together to provide the best evidence-based interventions to one of our most at-risk populations — incarcerated individuals with substance use disorders” stated Tina Ernst, Intervention Facilitator for HEALing Communities.

When it is time for participants to be released, HCJC pairs them with peer recovery supporters who help with connections to community treatment providers, transportation, and support. The recovery supporters arrive as early as 4 a.m. to drive participants to their first appointments and provide support to the individuals returning throughout their transition back into the community.

HCJC has built relationships with over 40 treatment agencies providing individualized care in the community, including intensive outpatient programs, outpatient MOUD, residential treatment programs, and recovery housing programs. HCJC staff and peer recovery supporters directly link participants to the appropriate community provider to ensure continuity of care.

The Hamilton County program is evidence that by embedding treatment and recovery options into criminal legal settings, communities can effectively target their programming to high-risk individuals as they pass through the system. Hamilton County reported a 16% reduction in overdose deaths in 2022, the first decrease in overdose deaths in four years.

HCJC is part of the HEALing Communities Study, (HCS), a multi-site research study, tested the impact of an integrated set of evidence-based practices across healthcare, behavioral health, justice, and other community-based settings. HEALing Communities is funded by the National Institutes of Health (NIH) Helping to End Addiction Long-term (HEAL) Initiative®. **(Dr. T. John Winhusen is HEALing Communities Study, Ohio co-Principal Investigator)**

**View the article published by Addiction Policy Forum:
[Hamilton County, OH Advances Treatment for Opioid Use Disorder in Jail](#)**

UC trial to test neurostimulation device to manage opioid withdrawal with PTSD symptoms



A new University of Cincinnati trial, in partnership with Spark Biomedical, will test a wearable neurostimulation device to help patients with opioid use disorder and post-traumatic stress disorder (PTSD) stick with medication treatment while finding the right dose. The National Institute on Drug Abuse has awarded UC's Joel Sprunger, PhD, a \$2.1 million grant to lead the trial testing Spark Biomedical's Sparrow Ascent device.

Study background

Sprunger said in his practice at the UC Health Addiction Sciences Clinic, he often sees patients with both opioid use disorder (OUD) and PTSD. "The rates of substance use disorder among people that have PTSD is relatively higher than other psychological disorders, and these happen to be co-occurring concerns that feed off of one another, making them difficult to treat," said Sprunger, assistant professor of psychiatry and behavioral neuroscience in UC's College of Medicine. "The needs of someone struggling with both PTSD and OUD can be a lot greater than if someone were struggling with one or the other. When someone is looking to make a change through treatment, it takes a lot of trust for people to engage in a therapeutic relationship, especially if they've been failed by trusted others before."

For both opioid withdrawal and PTSD, Sprunger said symptoms of these syndromes often affect the body's sympathetic nervous system's in ways relevant to the fight-or-flight response.

"With opioid withdrawal symptoms, you can experience things like anxiety, irritability, and sweating and people feel on edge and activated," he said. "With PTSD, there's overlap in terms of anxiety and irritability, but also a lot of hypervigilance, exaggerated startle responses, problems sleeping, and concentration difficulties." The medication buprenorphine is an effective treatment to help patients with OUD manage symptoms of opioid use disorder withdrawal, but there is an adjustment period of up to three months as each patient finds the right dose to manage their symptoms.

About 50% of people drop out of buprenorphine treatment during the dose adjustment period, and patients with PTSD are at even higher risk for stopping treatment.

In response to this challenge, the trial will utilize the Sparrow Ascent – a patient-administered wearable device that delivers mild electrical stimulation to the cranial branches of the vagus and trigeminal nerves on and around the ear.

Sprunger said the stimulation "pumps the brakes" on the sympathetic nervous system by enhancing parasympathetic activity, helping to transition someone from fight-or-flight to "rest and digest."

This method, known as transcutaneous auricular neurostimulation (tAN), is FDA-cleared for relieving opioid withdrawal symptoms and may also aid in alleviating symptoms of PTSD. The trial will test the safety and effectiveness of tAN in patients beginning buprenorphine therapy with these co-occurring conditions.

"By providing people control over that stimulation, we can empower them with a way to turn it on when needed and feel some relief," he

said. "Their heart rate slows down, breathing slows down and there's a lot less of a sense of panic and urgency. So that's the key ingredient that we think will hit both PTSD and opioid withdrawal symptoms at the same time."

Worn on and around the ear, the device is connected by a cable to a controller. Users can activate the stimulation whenever they need it and control its intensity. It can be worn up to 24 hours a day, and the earpiece is disposable and can be replaced each day.

"Autonomic imbalance is a common occurrence in PTSD, which is characterized by experiencing high sympathetic drive ('fight or flight') and low parasympathetic drive ('rest and digest')," said Navid Khodaparast, PhD, chief science officer at Spark Biomedical. "Additionally, PTSD sufferers experience lower levels of endorphin production which can lead to emotional distress. In this study, we believe tAN therapy will improve these PTSD symptoms, and ultimately help maintain long-term BUP treatment."

A total of 20 patients at the Gibson Center for Behavioral Change in Cape Girardeau, Missouri with opioid use disorder and PTSD taking buprenorphine as part of their standard of care will be randomized to either receive the stimulation through the Sparrow Ascent or active sham stimulation at a level that won't activate the targeted nerves. While there is a minimum required threshold of use each week of the 12-week study, Sprunger said patients can use the device as much as they feel is needed to help manage their symptoms.

In addition to its effect on physical symptoms, Sprunger said the device also gives represents a tool for patients that provides some direct control over a part of their recovery.

"I'm a psychologist, and I see my patients for up to an hour once a week. We can do some meaningful work in that hour, but there are many hours between then and when I might not see that person again," he said. "It's really important that people have something they are in control of that can provide some relief whenever they need the support. Being able to put something in their hands that they can use to feel better, especially one that is sensibly a healthy coping strategy, is also very powerful."

**Read the full UC news story by Tim Tedeschi:
[UC trial to test neurostimulation device to manage opioid withdrawal with PTSD symptoms](#)**

Does CBD really work?



As recreational marijuana sales are coming to Ohio, more CBD shops are springing up in the meantime selling a variety of tinctures, topicals and tonics with various claims of health benefits. CBD is claimed to relieve pain, anxiety, insomnia and more, but what does the research say?

The University of Cincinnati's LaTrice Montgomery, PhD, and Michael Privitera, MD, joined WXU's Cincinnati Edition to discuss how CBD claims stack up to scientific research.

Privitera said Epidiolex, a CBD medication for epilepsy, is currently the only Food and Drug Administration approved CBD treatment. Epidiolex contains more than 10 to 20 times the CBD concentration of products that can be purchased in health food stores or gas stations.

"There's a lot of other information out there, but...the FDA has not approved CBD for anything other than epilepsy," said Privitera, professor and division chief for epilepsy in UC's Department of Neurology and Rehabilitation Medicine in UC's College of Medicine and director of the

UC Gardner Neuroscience Institute Epilepsy Center. "If you look at for example medical marijuana laws in the state of Ohio, there's lots of conditions...But there's not been good randomized clinical trial data about most of the indications including pain, anxiety and sleep."

Montgomery said in Ohio, hemp products are certified by the Ohio Department of Agriculture, but it is not strictly regulated. Studies have found the actual concentration of CBD in consumer products can vary widely compared to what is on its label.

"So it may suggest there's a low level of THC in hemp products when actually there might be higher levels, and vice versa," said Montgomery, adjunct associate professor in the Department of Psychiatry and Behavioral Neuroscience in UC's College of Medicine and a licensed clinical psychologist. "So it's not very well regulated."

[Listen to the Cincinnati Edition segment](#)

Wall Street Journal: Inside the fight against school vaping



According to a Wall Street Journal, although "federal data show e-cigarette use dropped slightly among high-schoolers last year, teen vaping remains a serious concern among public-health officials, who say it can be highly addictive and can affect adolescent brain development."

The article highlights efforts being made by school officials to crack down on vaping to include using sensors and tobacco and marijuana sniffing canines over concern that vaping impedes success later in life.

"There is mounting evidence that vaping among teens can lead to nicotine addiction during this critical developmental period and follow them into adulthood," tobacco and addiction expert Ashley Merianos stated in the article.

Merianos is an associate professor in the School of Human Services, within the University of Cincinnati's College of Education, Criminal Justice and Human Services and is prolific researcher on the harms of first, second and third-hand smoke.

The article is available for WSJ subscribers only

[Read the Wall Street Journal article: Trained Dogs, High-Tech Sensors: Inside the Fight Against School Vaping](#)

News from the Ohio Valley Node

IMPROVE Studies in Progress!

Under the overall leadership of Dr. John Winhusen, current Lead Investigator of the CTN-0080 MOMs study, CTN investigators are conducting three research studies and one dissemination activity, described below:

- CTN 0150: Personally-Tailored Opioid-overdose and Medication for opioid use disorder (MOUD) Education (TOME; LI – Winhusen, OVN): This study is an intent-to-treat, open-label, randomized controlled trial planning to (1) evaluate the ability of TOME to increase MOUD and opioid-overdose knowledge in Pregnant and Post-partum (PP) persons; and (2) evaluate the ability of TOME to decrease MOUD-related internalized stigma and expected difficulty in avoiding drug use. Six sites are recruiting for this study, with final data collection planned for December.
- CTN 0080 A-1: Successful Recruitment And Retention In A Randomized Controlled Trial Of Pregnant and Post-Partum



People With Opioid Use Disorder (SUCCESS Study; LI – Smid, GIN). This ancillary study is performing qualitative interviews to identify successful strategies, facilitators, and barriers to recruiting pregnant individuals with opioid use disorder (OUD) and retaining them through the first year postpartum in the MOMs trial. Midpoint analyses have been conducted with the remainder of the interviews to be completed by January 2025.

- CTN 0080 A-2: Promoting Research with Mothers receiving OUD Treatment; a focus on Equity (PRoMOTE; LI – Schiff, NEC Node). This ancillary study applies mixed-methods to investigate facilitators and barriers to treatment initiation of medications to treat opioid use disorder (MOUD), trial engagement, and study retention in CTN-0080, with a focus on race and equity. The study is actively recruiting with final data collection planned for December.
- CTN 0080 A-3: Improved Messaging Strategies for MOUD For Underserved Populations Of Pregnant And Postpartum Individuals With OUD (LI – Kropp, OVN). This goal of this project (not a research study) is to develop innovative and meaningful education/messaging strategies that will target areas such as (1) addiction disease & NOWS, (2) the role of medications in the management of OUD and overdose prevention, (3) stigma and health system mistrust, and (4) PP persons rights to treatment. The study has developed several written materials, a teaching video, and a number of social media reels and posts. Public release of these materials is anticipated for August.



CTN-0129 Team presents at National Indian Health Board Conference

Investigators and collaborating community partners for CTN-0129 “The Great Plains Initiative” presented a discussion panel about the study at the National Indian Health Board conference on May 22, 2024, in Rapid City, SD. The panel was moderated by Brynn Luger, PhD and included Lead Investigator Donald Warne, MD, MPH, T. John Winhusen, PhD, Gene Tyon, MA of Oaye Luta Okolakiciye, Barbara Dull Knife, BS of Wakanyeia Gluwitayan Otipi, and Ellen Durkin MSW of South Dakota Urban Indian Health. Allison Kelliher, MD joined the panel via Zoom. The Great Plains Initiative has two primary aims. Aim 1 is to determine community-defined needs for identifying and addressing substance use issues in order to create a Great Plains American Indian substance use research agenda. Such issues may involve a broad range of topics, such as specific substance misuse, barriers to treatment, the role of historical trauma in substance use, mistrust of research, and others as determined through the Community-based participatory research process. Aim 2 is to explore the feasibility of promoting the use of telehealth platforms to promote access to and utilization of medication for opioid use disorder treatment in tribal communities in the Great Plains.

Learn more about The Great Plains Initiative:
[The Great Plains Initiative](#)

Center for Addiction Research 2024 Summer Speaker Series

To view the completed sessions recordings and presentation slides, or to register for the final virtual August session, please visit the [2024 Summer Speaker Series](#) webpage.

Risk Reduction in Human Trafficking and Substance Use Disorders: Bringing Education, Testing and Treatment to the Community

Wednesday,
 June 12, 2024
 12:00–1:00 p.m.



Caroline Freiermuth, MD, MHS, University of Cincinnati



LeAnn Sanson, Weighless Anchor

Participants ≈ 35

Survey Rating:

100% rated the session as being very good or excellent

A Unique, Co-Designed Family-Based Therapy for Marginalized Women with Opioid Use Disorder and Justice-Involvement

Wednesday,
July 10, 2024
12:00–1:00 p.m.



Aaron Murnan, PhD, LMFT, University of Cincinnati



Gwen England, MS, CATCH, Sex Trafficking Specialty Docket Program

Participants ≈ 57

Survey Rating:

100% rated the session as being very good or excellent

CAR Member Recognition



Research Rainmakers:

The UC Office of Research celebrates its outstanding researchers

In January, the UC Office of Research celebrated the outstanding achievements of faculty in the area of sponsored research in fiscal year 2023. Those recognized are in the top 25% in the categories of the arts, humanities, social sciences, technology, science, engineering, mathematics, and medicine. Additionally, the UC Office of Research also recognized the top collaborative research awards from across the university.

Congratulations to **Dr. T. John Winhusen, CAR Director**, for being recognized the eighth time for this accomplishment since fiscal year 2016.



Congratulations to **Jason Blackard, PhD**, who was appointed Walter A. and George McDonald Foundation Professorship of Medicine, Department of Internal Medicine, effective March 1, 2024 – August 31, 2029, by the UC Board of Trustees at its February 27 meeting.



CoM Office of Research Gallery of Awardees

The CoM Office of Research publicizes faculty who have been awarded external grants of \$100,000/yr. or more.

Congratulations to **Jayme McReynolds, PhD**, assistant professor, Department of Pharmacology and Systems Physiology, National Institute on Drug Abuse R01, “Role of Prelimbic Cortical Endocannabinoid Signaling in Enhanced Cocaine-seeking Behavior Following Combined Repeated Stress and Cocaine Use in Rats.”



Congratulations to Dr. Aaron Murnan, Assistant Professor, Population Health, College of Nursing, recipient of a 2024 Collaborative Research Advancement Program Pilot Grant

The Collaborative Research Advancement Program Pilot Grants, as part of the Office of Research’s goal to seed interdisciplinary collaborative research, provide support for high-potential team research and creative activities. The program aims to help teams develop their research and increase their competitiveness and capacity for major external awards and funding opportunities. Each year, following a two-stage application and evaluation process, up to eight \$25,000 grants and up to two \$25,000 space-specific grants are awarded.

Center for Addiction Research (CAR)

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CAR Director:
Dr. T. John Winhusen

Changing outcomes,
saving lives through
work on opioid,
stimulant, cannabis,
and alcohol use
disorders



CAR Mission

To accelerate scientific progress in the prevention and treatment of substance use disorders and their consequences by fostering research collaborations across:

- UC departments, colleges, and centers including Cincinnati Children's Hospital Medical Center
- Local, regional, and state community and governmental partners
- Other academic institutions and industry

The CAR includes three research concentrations (cores):

- Addiction Treatment Development and Testing (ATT)
- Perinatal Addiction/Developmental-consequences (PAD)
- Population Health and Health Services (PHHS)

Find out more about the CAR using the website link below: <https://med.uc.edu/institutes/CAR/home>

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