Center on Rural Addiction
UNIVERSITY OF VERMONT

Methamphetamine and Cocaine 2025: Health Impacts and Effective Treatments (Part 1)

Richard Rawson, PhD

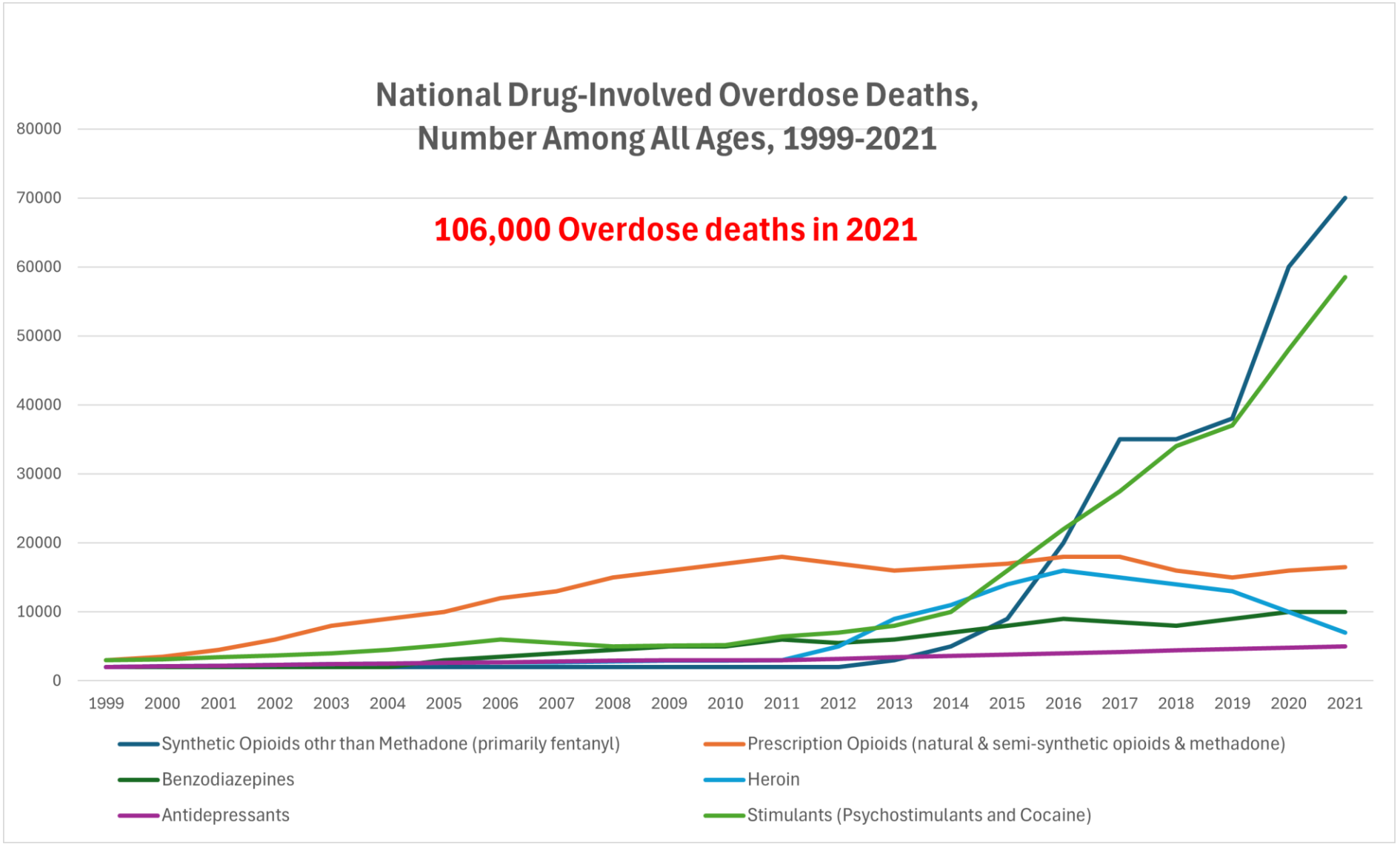
Research Professor, Vermont Center for Behavior and Health, University of Vermont, Burlington, VT

Professor Emeritus, Department of Psychiatry and Biobehavioral Sciences, University of California, Los Angeles, CA

Center on Rural Addiction
UNIVERSITY OF VERMONT

Why should we be concerned about stimulant use (cocaine and methamphetamine)?

Center on Rural Addiction
UNIVERSITY OF VERMONT



Friedman, J., Shover, C. Charting the Fourth Wave: Geographic, Temporal, Race/Ethnicity, and Demographic Trends in Polysubstance Fentanyl Overdose Deaths in the United States, 2010-2021

medRxiv 2022

Center on Rural Addiction
UNIVERSITY OF VERMONT

Methods

- Data were obtained from the CDC Wide-ranging Online Database for Epidemiological Research (WONDER) from 2010 through 2021.
- All deaths with underlying cause of overdose were selected.
- From these deaths with multiple causes were selected.
- Annual percentage of overdose deaths were measured for those involving: fentanyl, stimulants, fentanyl and stimulants, and neither fentanyl or stimulants.

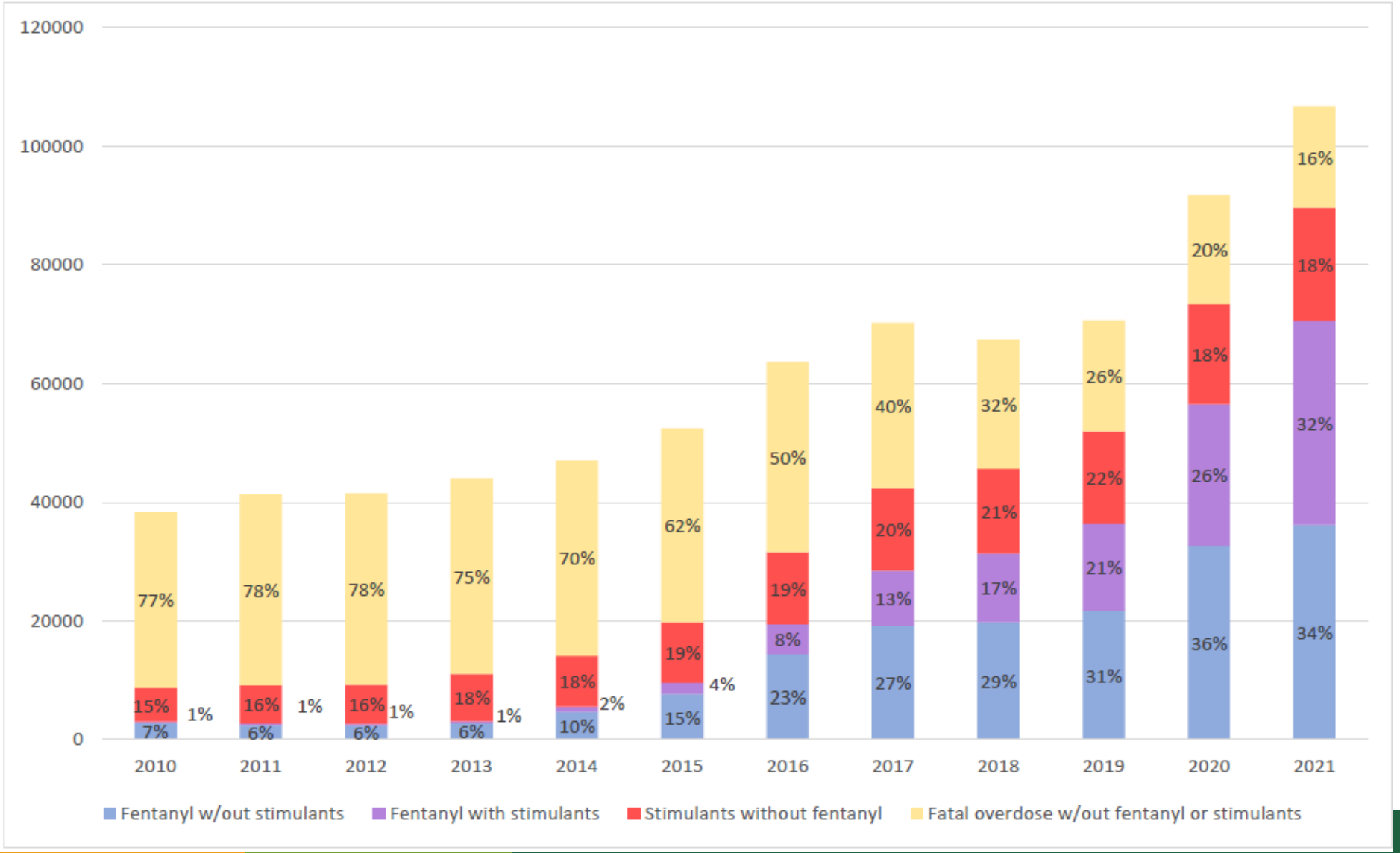
Center on Rural Addiction
UNIVERSITY OF VERMONT

Results

- The percentage of overdose deaths involving fentanyl and stimulants concurrently rose nearly 60-fold from 0.6% (n=235) in 2010 to 32.3% (n=34,424) in 2021.
- The percentage of overdose deaths involving fentanyl without stimulants rose from 7.2% to a peak of 35.7% in 2020 and declining to 33.9% in 2021.
- The proportion of deaths with stimulants and no fentanyl remained stable with 14.8% in 2010 and 17.9% in 2021.

Center on Rural Addiction
UNIVERSITY OF VERMONT

Overdose Deaths by Fentanyl and Stimulant Presence, 2010-2021



No fentanyl or stims

Stims only

Fentanyl & stims

Fentanyl only

Li Y, Pierce DV, Vik S, Dong K, Patten S, Zhang Y, et al. (2025) Co-involvement of stimulants with opioids in North America: A 'silent epidemic'. PLOS Ment Health 2(7): e0000319. https://doi.org/10.1371/journal. pmen.0000319

Center on Rural Addiction
UNIVERSITY OF VERMONT

Introduction

- The co-involvement of stimulants with opioids has been referred to as a “silent” or “twin” epidemic.
- Individuals who use both stimulants and opioids have twice the likelihood of overdose compared to those who only use opioids.
- It is important to monitor public attention on opioids and stimulants so as to increase awareness of the problem and also of solutions.

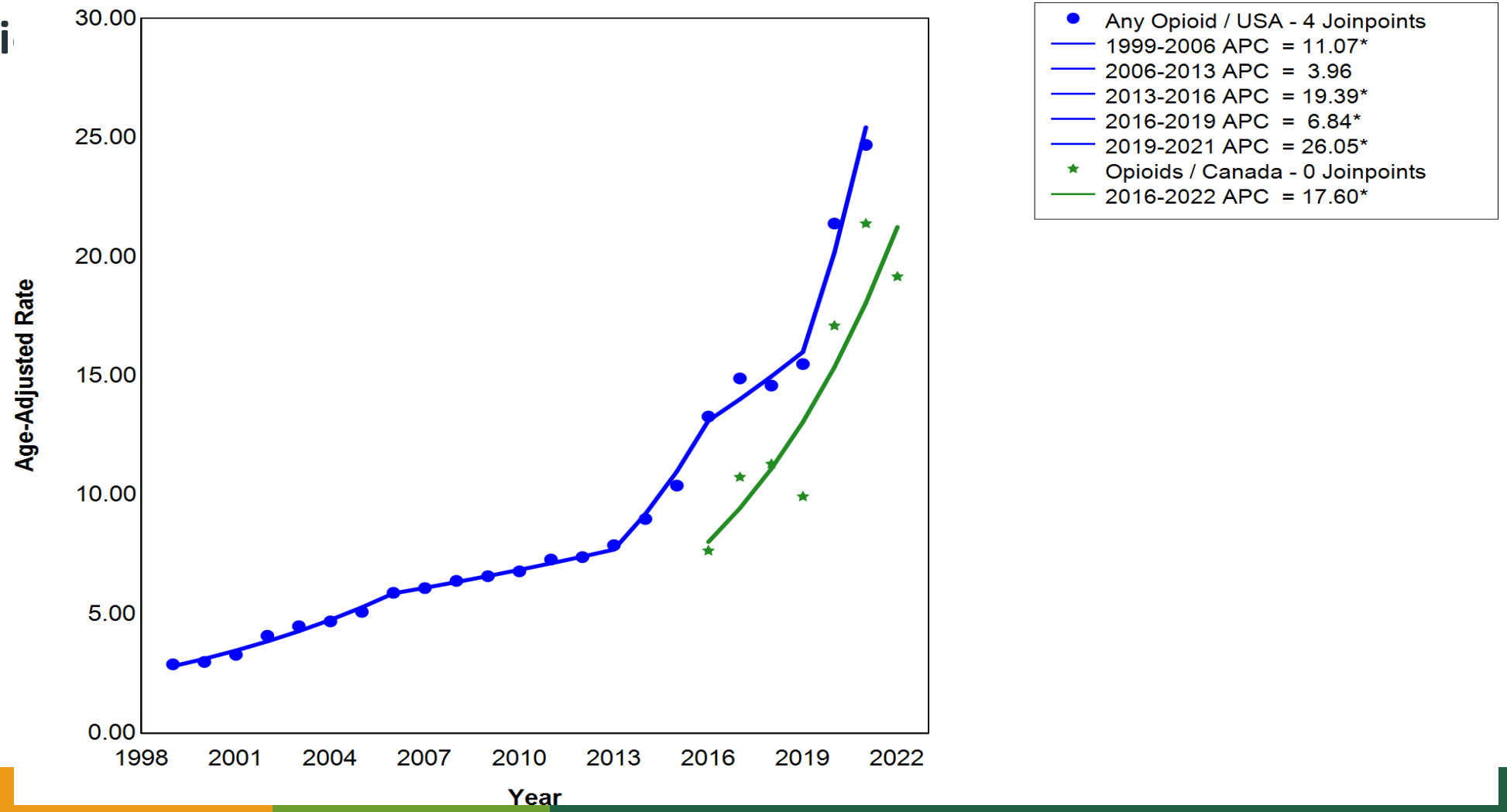
Center on Rural Addiction
UNIVERSITY OF VERMONT

Introduction

- Google Trends can be used to monitor awareness. This is a free tool that allows monitoring of search terms to track public interest.
- Google Trends measures the relative search interest (RSI) for a specific topic or term.
- The aim of this study was to describe relevant trends for opioid and stimulant overdose deaths in North America and to determine whether trends in public interest and attention mirror those trends.

Center on Rural Addiction
UNIVERSITY OF VERMONT

The annual percentage change (APC) in the number of deaths per year for opi



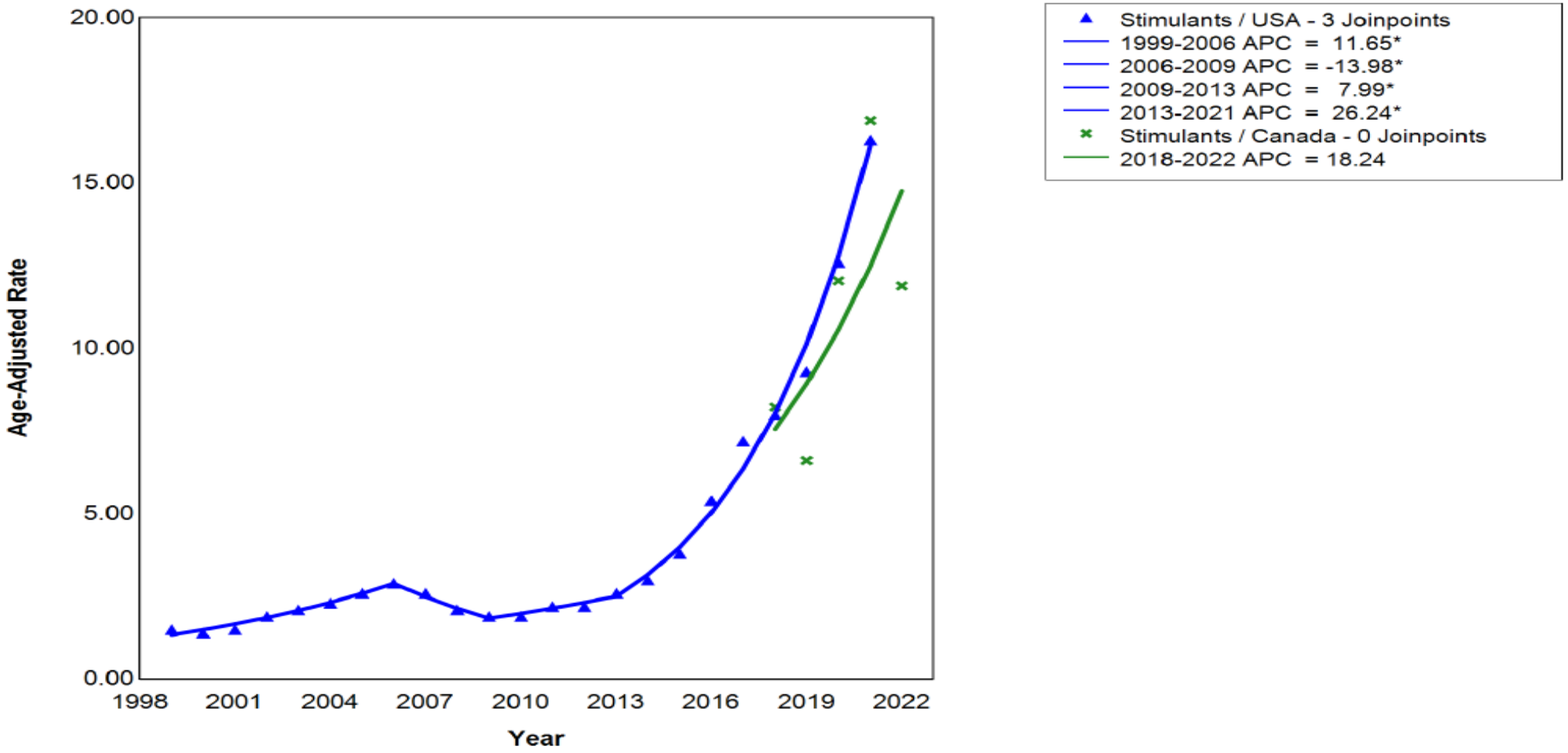
Center on Rural Addiction
UNIVERSITY OF VERMONT

Results: Stimulant-involved Deaths

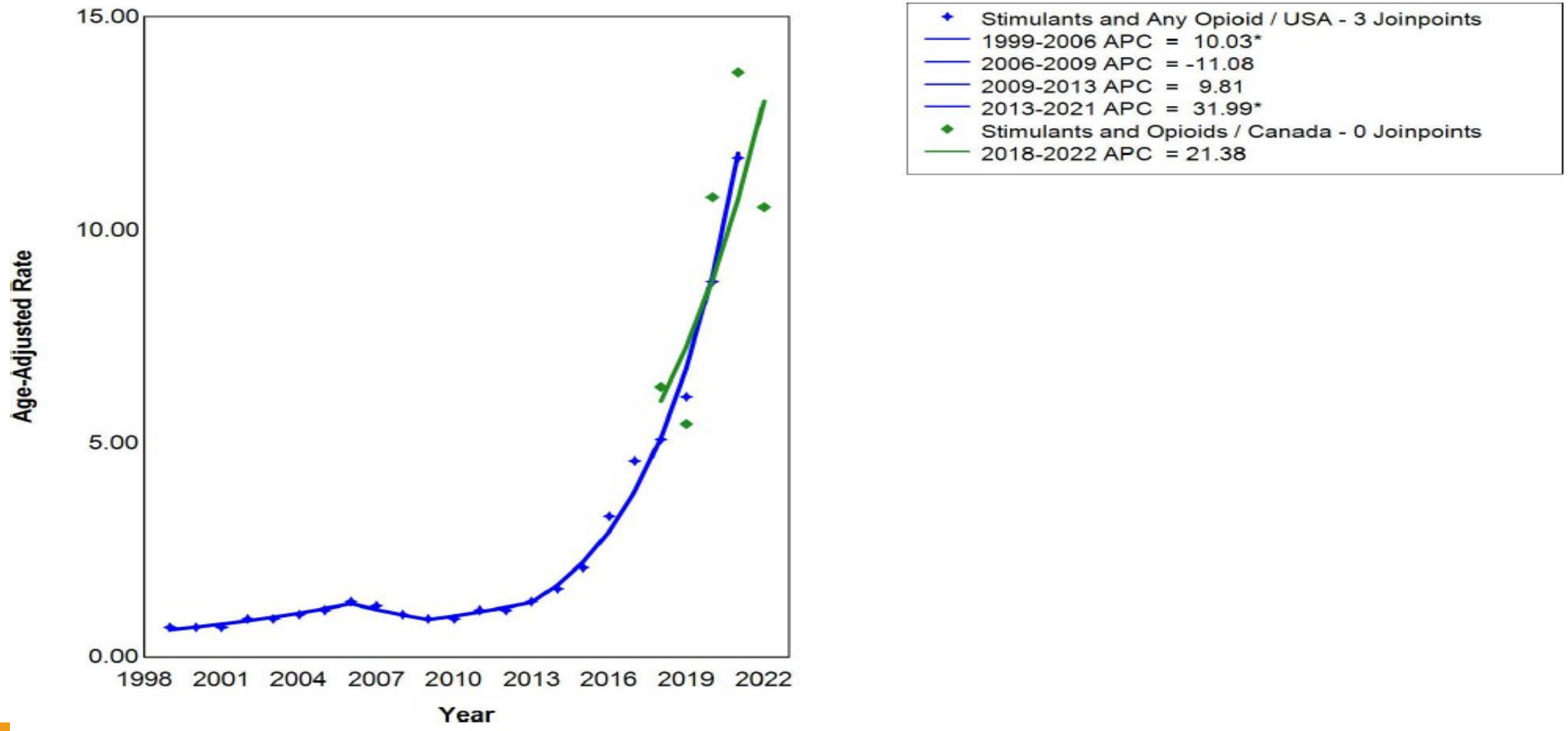
- There was an increase in stimulant-involved deaths in the U.S. from 1999-2021.
- There were four significant segments: 1999-2006, 2006-2009, 2009-2013, and 2013-2021.
- APC for each segment: 11.65, -13.98, 7.99, and 26.24.
- For Canada the significant APC was 18.24 for 2018-2022.

Center on Rural Addiction
UNIVERSITY OF VERMONT

The annual percentage change (APC) in the number of deaths per year for sti

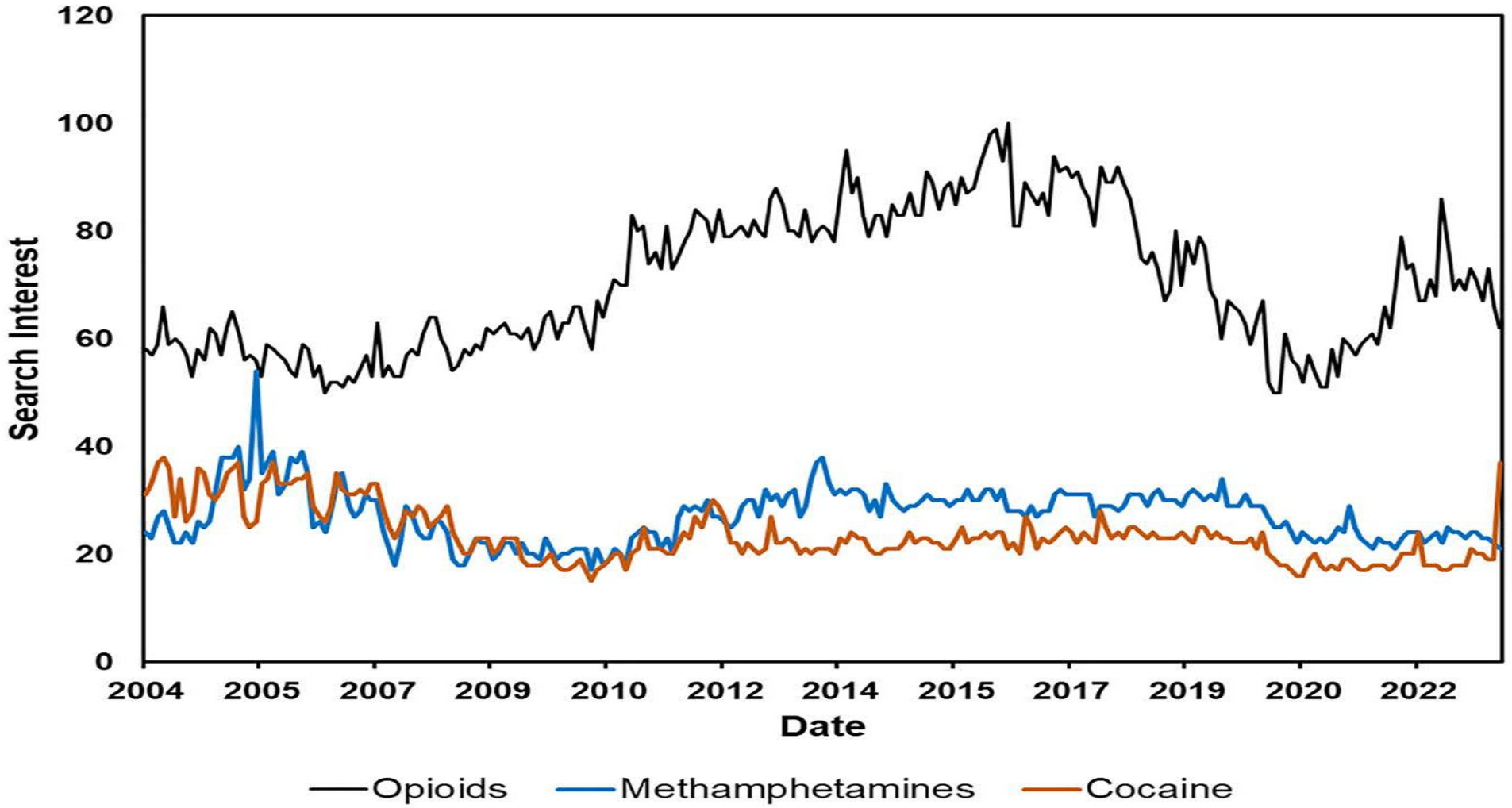


Center on Rural Addiction
UNIVERSITY OF VERMONT



Center on Rural Addiction
UNIVERSITY OF VERMONT

Google Trends Interest over Time. U.S.



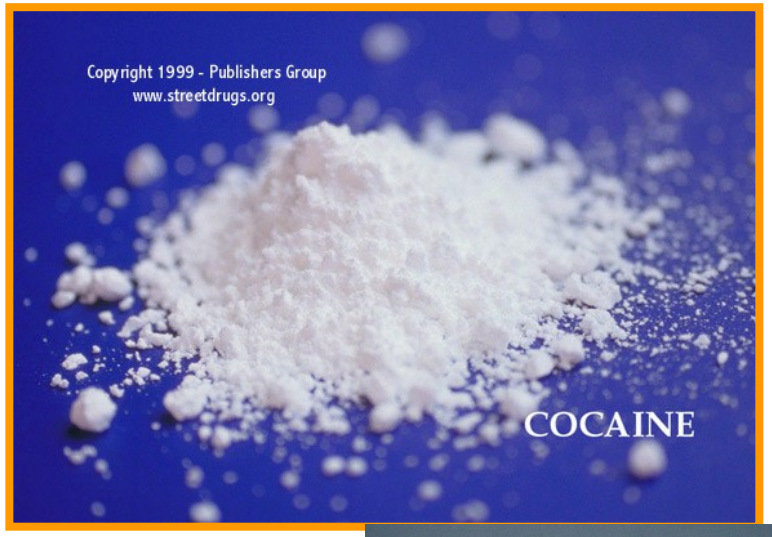
Center on Rural Addiction
UNIVERSITY OF VERMONT

Discussion

- Public interest in stimulants has dropped from a peak in 2004-2005.
- Relative interest in opioids is much higher.
- Given the ongoing increase of stimulant use and co-involvement of stimulants and opioids there is an urgent need to develop and implement strategies that reduce the health risks associated with stimulant use.
- More awareness and advocacy of effective treatments such as contingency management for stimulants is critical.

Center on Rural Addiction
UNIVERSITY OF VERMONT

Stimulants



Center on Rural Addiction
UNIVERSITY OF VERMONT

Stimulants

- Description: A group of synthetic and plant-derived drugs that increase alertness and arousal by stimulating the central nervous system. Although MDMA (ecstasy) has some hallucinogenic properties, it is often classified as a stimulant
- Medical Uses: Short-term treatment of obesity, narcolepsy, and hyperactivity in children
- Method of Use: Intravenous, intranasal, oral, smoking

Center on Rural Addiction
UNIVERSITY OF VERMONT

Methamphetamine vs. Cocaine

- Cocaine half-life: 2 hours
- Methamphetamine half-life: 10 hours
- Cocaine paranoia: 4 - 8 hours following drug cessation
- Methamphetamine paranoia: 7-14 days
- Methamphetamine psychosis - May require medication / hospitalisation and may not be reversible
- Neurotoxicity: Appears to be more profound with amphetamine-like substances

Center on Rural Addiction
UNIVERSITY OF VERMONT

Methamphetamine

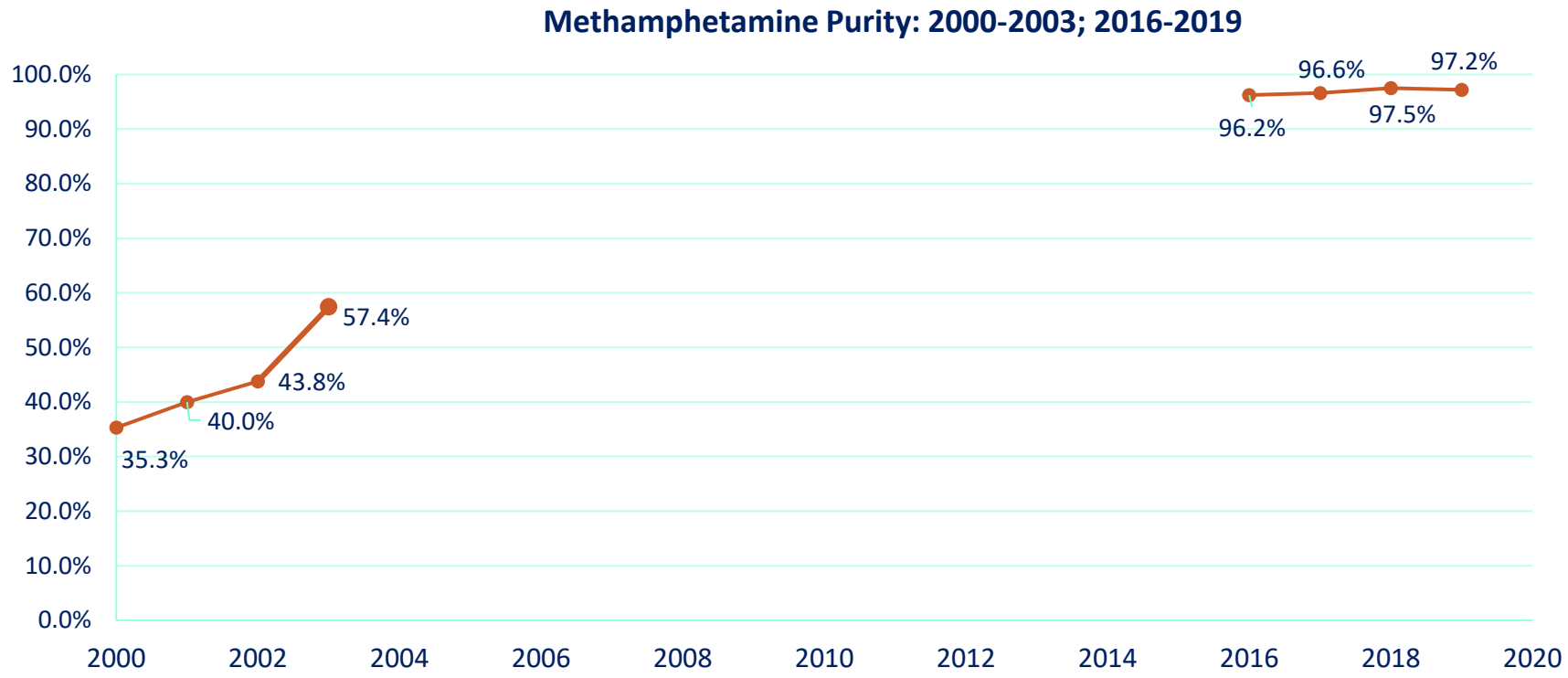
Center on Rural Addiction
UNIVERSITY OF VERMONT

Potency and Purity

- Potency refers to how much of the drug is needed to produce an effect.
- The shift from ephedrine and pseudoephedrine precursors to phenyl-2-propanone (P2P) has resulted in greater potency.
- A slight difference in the arrangement of the atoms results in greater potency.
- In the make up of MA there can be a d-isomer and an l-isomer. The former results in greater potency which is determined by the proportion of d-isomer in the MA.
- Purity refers to how much methamphetamine is present compared to other inert substances.

Center on Rural Addiction
UNIVERSITY OF VERMONT

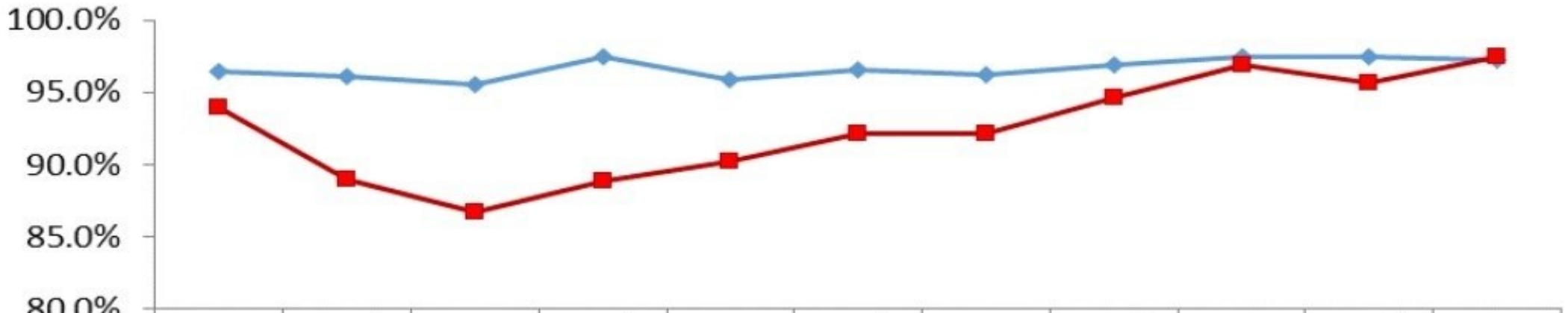
Methamphetamine purity 2000-2003 & 2016-2019



Sources: The National Threat Assessment, 2005, National Drug Intelligence Center, U.S. Dept. of Justice
DEA Methamphetamine Profiling Program.
National Drug Threat Assessment, 2020. DEA Methamphetamine profiling program.

Center on Rural Addiction
UNIVERSITY OF VERMONT

Methamphetamine Purity and Potency



	1st 2014	2nd 2014	1st 2015	2nd 2015	1st 2016	2nd 2016	1st 2017	2nd 2017	1st 2018	2nd 2018	1st 2019
Purity	96.5%	96.2%	95.6%	97.5%	95.9%	96.6%	96.2%	96.9%	97.5%	97.5%	97.2%
Potency	94.0%	89.0%	86.7%	88.9%	90.2%	92.1%	92.1%	94.6%	96.9%	95.6%	97.5%

e: DEA Methamphetamine Profiling Program

Center on Rural Addiction
UNIVERSITY OF VERMONT

Methamphetamine Overdose

In 2022, it should be assumed that a person who overdoses on meth, likely also is experiencing a fentanyl overdose, typically evidenced by decreased respiration (stopped breathing)

- Treat with naloxone using protocols for fentanyl

In some parts of the US there are a significant number of individuals who experience methamphetamine overdose without fentanyl. With a methamphetamine overdose without fentanyl, death can occur from:

- Hyperthermia (very high body temperature; eg 107-108 degrees)
- Stroke
- Cardiac events (eg heart attack, severe hypertension)

It is possible for an individual to have a combined overdose from fentanyl and methamphetamine, requiring treatment for both drugs.

Bazazi AR, Low P, Gomez BO, Snyder H, Hom JK, Soran CS, Zevin B, Mason M, Graterol J, Coffin PO. Overdose from Unintentional Fentanyl Use when Intending to Use a Non-opioid Substance: An Analysis of Medically Attended Opioid Overdose Events. J Urban Health. 2024 Apr 3. doi: 10.1007/s11524-024-00852-0. Epub ahead of print. PMID: 38568466.

Center on Rural Addiction
UNIVERSITY OF VERMONT

Results

281cases of non-fatal overdose cases attended by paramedics in San Francico from June to September 2022 met definition for opioid overdose.

171 reported intended substance use.

- 98 of 171 (57%) reported Intentional opioid use and 96 of these almost all (98.0%) intended to use fentanyl.
- 73 of 171, (43%) reported no intentional opioid use with 53 (31% of the total) intending to use stimulants.

Center on Rural Addiction
UNIVERSITY OF VERMONT

Results

- No intentional opioid use was reported by 58.5% of Black, 52.4% of Latinx, and 28.8% of White individuals.
- By gender, 57.6% of women and 39.5% of men reported no intentional opioid use.
- Those reporting no intentional opioid use were older than those reporting intentional opioid use (median age 40.5 years vs 36.0%).

Center on Rural Addiction
UNIVERSITY OF VERMONT

Stimulant effects

Stimulants: Acute Effects

- Euphoria
- Increased talkativeness
- Hyperactivity
- Erratic changes in mood
- Increased blood pressure
- Elevated body temp
- Rapid heart and breathing rates

- Reduced fatigue
- Reduced hunger
- Increased energy
- Increased sexual drive
- Increased self-confidence

Center on Rural Addiction
UNIVERSITY OF VERMONT

Stimulants: Chronic Effects

- Psychosis
- Paranoia
- Symptoms of Anxiety and Depression
- Social withdrawal
- Emotional volatility
- Violence

Center on Rural Addiction
UNIVERSITY OF VERMONT

Stimulants: Psychiatric consequences

Paranoia

Protracted memory impairment

Depressive/dysthymic reactions

Hallucinations

Psychosis

Panic disorders

Rapid addiction

Center on Rural Addiction
UNIVERSITY OF VERMONT

Zhao J, Kral AH, Simpson KA, Ceasar RC, Wenger LD, Kirkpatrick M, Bluthenthal RN. Factors associated with methamphetamine withdrawal symptoms among people who inject drugs. Drug Alcohol Depend. 2021 Apr 10;223:108702. doi: 10.1016/j.drugalcdep.2021.108702. Epub ahead of print. PMID: 33894459.

Center on Rural Addiction
UNIVERSITY OF VERMONT

Introduction

- Methamphetamine (MA) withdrawal is characterized by depression, fatigue, sleep disturbance, increased appetite, depression, and anxiety.
- Symptoms can persist 4 weeks.
- There is a significant impairment in daily functioning.
- Withdrawal can pose a barrier to harm reduction practices.
- Recent studies have identified increasing rates of methamphetamine (MA) injection.
- This study looks at the prevalence, frequency, and severity of MA withdrawal symptoms in a cohort of PWID.

Center on Rural Addiction
UNIVERSITY OF VERMONT

Results

- Drug use past 30 days
  - Median frequency: 173 times
  - Median number of injections: 112 times
- MA withdrawal in past 6 months
  - 53% of PWID reported withdrawal
  - 25% reported weekly symptoms
  - 20% reported very or extremely painful symptoms

Center on Rural Addiction
UNIVERSITY OF VERMONT

Discussion

- Tranquilizer use which is associated with MA withdrawal may be reflective of self-medication of anxiety and sleeplessness in withdrawal.
- MA withdrawal symptoms are common among PWID and are associated with receptive syringe sharing.
- Receptive syringe sharing is associated with rushed injecting in public settings with increased risk of overdose and other adverse outcomes.
- Safe supply and syringe services programs targeting people who inject MA are indicated.

Jones CM, Zhang K, Han B, Guy GP, Losby J, Einstein EB, Delphin-Rittmon M, Volkow ND, Compton WM. Estimated Number of Children Who Lost a Parent to Drug Overdose in the US From 2011 to 2021. JAMA Psychiatry. 2024 Aug 1;81(8):789-796. doi: 10.1001/jamapsychiatry.2024.0810. PMID: 38717781; PMCID: PMC11079787.

Center on Rural Addiction
UNIVERSITY OF VERMONT

Results

- From 2011 to 2021, 649,599 adults aged 18 to 64 years died from drug overdose.
  - 66.2% male and 33.8% female.
  - 9.6% Hispanic
  - 1.1% non-Hispanic American Indian or Alaska Native
  - 0.9% non-Hispanic Asian or Pacific Islander
  - 12.7% non-Hispanic Black
  - 74.8% non-Hispanic White
  - 0.9% non-Hispanic with more than one race.

Center on Rural Addiction
UNIVERSITY OF VERMONT

Results

- An estimated 321,566 children lost a parent to drug overdose.
- The rate of children who lost a parent to drug overdose per 100,000 increased from 27.0 per 100,000 in 2011, to 63.0 per 100,000 in 2021.

Center on Rural Addiction
UNIVERSITY OF VERMONT

Results

- The highest rates were found among children of non-Hispanic American Indian or Alaska Native individuals (187.1 per 100,000 in 2021).
- This is more than double the rate among children of non-Hispanic White individuals (76.5 per 100,000), and non-Hispanic Black individuals (73.2 per 100,000).
- Rates increased for both fathers and mothers, however more children lost fathers (estimated 192,459) than mothers (estimated 129,107).

Center on Rural Addiction
UNIVERSITY OF VERMONT

Paulus, M. P. and Stewart, J.L. ,
Neurobiology, Clinical Presentation and Treatment of Methamphetamine Use Disorder:
A Review. JAMA Psychiatry, 77:959-966.
doi:10.1001/jamapsychiatry.2020.02462020

Center on Rural Addiction
UNIVERSITY OF VERMONT

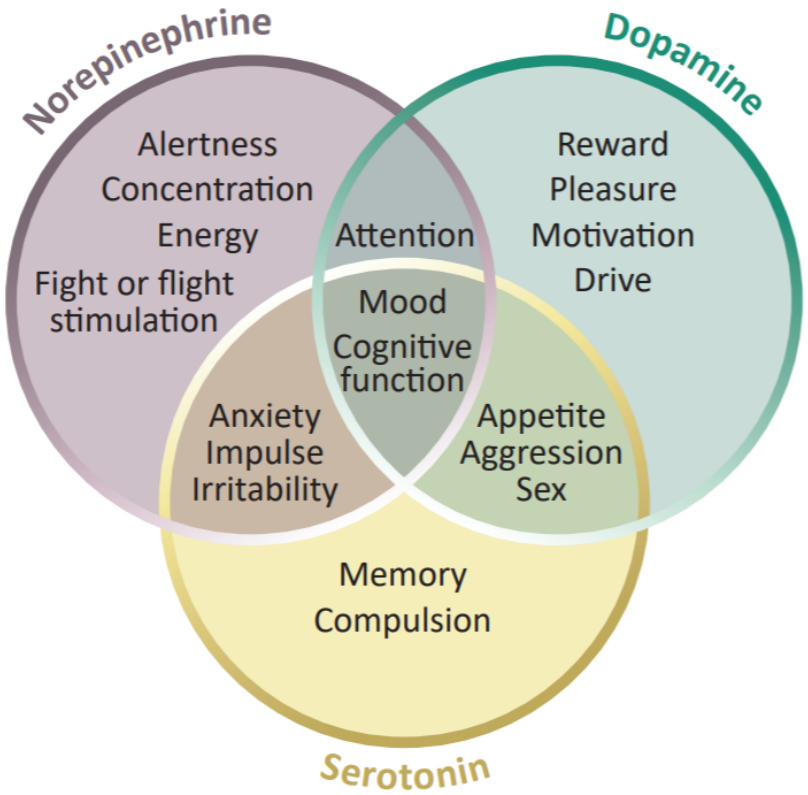
Methamphetamine neurotoxicity

- Excessive dopamine resulting in damaged cell structures
- Cell death
- Activation of dopamine D3 receptors resulting in hyperthermia
- Disruption of the blood-brain barrier
- Overall, the altered brain state is consistent with degenerative central nervous system diseases.

Center on Rural Addiction
UNIVERSITY OF VERMONT

Behavioral effects of neurotransmitters

FIG. 1 Behavioural effects mediated by the three main neurotransmitters



Center on Rural Addiction
UNIVERSITY OF VERMONT

Cognitive effects

Soon after cessation of methamphetamine use:

- Poor performance on motor and processing tasks
- Poor performance on verbal fluency and attention

After prolonged abstinence:

- Poor learning efficiency and comprehension
- Poor visual-spatial processing
- Slow processing and psychomotor speed

Center on Rural Addiction
UNIVERSITY OF VERMONT

Cognitive effects

- It is estimated the more than 2/3 of those with methamphetamine use disorder show cognitive impairment.
- Impairment is associated with older age, longer duration of use, injection route of administration and greater frequency of use.
- Impairment may limit ability to follow through with treatment, comprehend advice and direction in treatment as well as generally achieve good treatment outcomes.

Center on Rural Addiction
UNIVERSITY OF VERMONT

Cerebrovascular and cardiovascular disease

Leading causes of death with methamphetamine use disorder:

- Strokes on rise, most often with young men
- Strokes are primarily hemorrhagic

Cardiovascular disease associated with methamphetamine use:

- Pulmonary hypertension
- Cardiac arrhythmia
- Cardiomyopathy

Center on Rural Addiction
UNIVERSITY OF VERMONT

Phillip O. Coffin, M.D., M.I.A. and Leslie W. Suen, M.D. (2024) Methamphetamine Toxicities and Clinical Management. New England Journal of Medicine: Evidence. November 28, 2023, NEJM Evid 2023; 2 (12)
DOI: 10.1056/EVIDra2300160

Center on Rural Addiction
UNIVERSITY OF VERMONT

Coffin and Suen 2023
Abstract

Methamphetamine use has increased over the past 15 years, with corresponding increases in associated morbidity and mortality. Toxicities from methamphetamine use largely consist of vascular and neuropsychiatric disorders, and are more likely to be due to long term rather than acute exposure. The approach to managing methamphetamine use in clinical care settings has advanced recently, with universal diagnostic criteria for substance use disorders, promising data for several off-label pharmacotherapies, novel ideas for preventing and treating vascular and neuropsychiatric toxicities, and systematic prevention and screening for associated infectious and medical disorders among people who use substances.

Clinical Manifestations of Methamphetamine Toxicity (Coffin and Suen 2023)

- VASCULAR METHAMPHETAMINE TOXICITIES
  - 23% of emergency department visits resulting from methamphetamine use, with “chest pain” being the most common chief report
  - Cardiac complications of methamphetamine use include systemic hypertension, dilated cardiomyopathy, atherosclerosis, arrythmias, and aortic dissection
  - Cause of death associated with meth use: 20% had a cardiac cause of death and 55% had a cerebrovascular cause; an additional 27% had cardiac significant contributing conditions listed on the death certificate.
- NEUROPSYCHIATRIC METHAMPHETAMINE TOXICITIES
  - Cognitive Decline and Psychosis
  - 50% of ED admissions associated with meth are due to psychiatric symptoms
  - Risk for Parkinson’s disease is increased 1.5- to 3-fold.

Center on Rural Addiction
UNIVERSITY OF VERMONT

Smid, M., Metz and Gorden. (2019).
Stimulant Use in Pregnancy:
An Under-Recognized Epidemic Among Pregnant Women, Clin Obstet Gynecol. 62(1), 168–184.

Center on Rural Addiction
UNIVERSITY OF VERMONT

Stimulant use in pregnancy

Meta-analysis of 31 studies found cocaine use during pregnancy increased risk of:

- pre-term delivery,
- low birth weight,
- small for gestational age, (Gouin, 2011).

Meta-analysis of 8 studies found methamphetamine use during pregnancy was associated with:

- earlier gestational age at delivery,
- lower birth weight,
- smaller head circumference (Kalaitzopoulos, 2018).

Infants with prenatal exposure to methamphetamine exhibit jitteriness, drowsiness, and respiratory distress suggesting withdrawal.

Cocaine and methamphetamine are excreted in breastmilk and contraindicate breastfeeding.

Center on Rural Addiction
UNIVERSITY OF VERMONT

Stimulant use in pregnancy

- Long-term follow-up of 204 methamphetamine exposed maternal-child pairs and 208 unexposed pairs (Derauf et al., 2007).
- At one month, 33% methamphetamine-exposed mothers did not have custody compared to 2% of unexposed.
- At age 3 years, heavy prenatal methamphetamine use (> 3days per week) was associated with anxiety/depression and attention problems.
- At age 7.5 years, methamphetamine-exposed children had poorer cognitive function.
- UCLA Study of 4-5 year olds found impoverished vocabulary and poorer fluency with language.

Center on Rural Addiction
UNIVERSITY OF VERMONT

Dental effects

- Rampant caries and tooth fracture most common (Shaner, 2002; 2006)
- Periodontal disease
- Mechanisms:
  - Poor oral hygiene
  - Xerostomia (dry mouth)
    - Alpha 2 receptor stimulation inhibits saliva
    - Dehydration from appetite suppression and increased psychomotor activity
  - Soft drink consumption
  - Bruxism
  - Acidic content of MA (controversial)
  - Corrosive contaminants of MA (smoking)

Center on Rural Addiction
UNIVERSITY OF VERMONT

Dermatological effects

- Pruritis from vasoconstriction
- Cutaneous ulcers and excoriations from skin picking (formication, “meth bugs”)
- Abscesses (“skin popping” confers greatest risk)
- Cellulitis
- Burn injuries
- Ulcers associated with co-use of xylazine

Center on Rural Addiction
UNIVERSITY OF VERMONT

Rawson, R.A., Washton, A.M., Domier, C.P., & Reiber, C. (2002). Drugs and sexual effects: Role of drug type and gender. *Journal of Substance Abuse Treatment 22*(2), 103-108

Foulds, JA, Boden, JM, McKetin, R. and Newton, Howes, G. 2020 Methamphetamine use and violence: Findings from a longitudinal birth cohort. Drug and Alcohol Dependence, 207. 43-53.

Center on Rural Addiction
UNIVERSITY OF VERMONT

Methamphetamine and Violence

Foulds et al., 2020

- Compared to no use, amphetamines use was associated with a 2-fold increase in the odds of hostility or violence.
- Frequent and heavier/injection use increases the risk of violent behavior.
- Other risk factors included: psychotic symptoms, alcohol or other drug use, psychosocial problems, and impulsivity.
- A majority of violent episodes occurred during periods of psychosis

Brandon D.L. Marshall, Sandro Galea, Evan Wooda, Thomas Kerr Injection methamphetamine use is associated with an increased risk of attempted suicide: A prospective cohort study. (2011) Drug and Alcohol Dependence, 119. 134-137.

Center on Rural Addiction
UNIVERSITY OF VERMONT

Marshall et al. 2011. Results

- Of 1873 eligible participants, 149 (8.0%) reported a suicide attempt, resulting in an incidence density of 2.5 per 100 person-years.
- Participants who attempted suicide were more likely to be younger (median: 35 vs. 40, $p < 0.01$), female (48.3% vs. 35.1%, $p < 0.01$), and of Aboriginal ancestry (43.6% vs. 31.3%, $p < 0.01$).
- MA injection was associated with an 80% increase in the risk of attempting suicide (adjusted hazard ratio = 1.80, 95% CI: 1.08–2.99, $p = 0.02$).

Center on Rural Addiction
UNIVERSITY OF VERMONT

Clinical Challenges: Treating Individuals with Stimulant Use Disorder

- Overdose death/Lethality of currently available methamphetamine
- Limited understanding of stimulant addiction
- Ambivalence about need to stop use
- Impulsivity/Poor judgement
- Cognitive impairment and poor memory
- Anhedonia

Center on Rural Addiction
UNIVERSITY OF VERMONT

Clinical Challenges
Treating Individuals with Stimulant Use Disorder

- Hypersexuality/Hyposexuality
- Violence and psychosis
- Powerful Pavlovian trigger-craving response
- Elevated rates of psychiatric co-morbidity
- Very difficult to engage in treatment
- Very poor retention in outpatient treatment

Center on Rural Addiction
UNIVERSITY OF VERMONT

Special Treatment Considerations

- People who inject.
- People who use stimulants daily or in very high doses.
- Women (high rates of physical/sexual abuse).
- Homeless, chronically mentally ill and/or individuals with high levels of psychiatric symptoms at admission.
- Men who have sex with men (MSM).
- People who use stimulants who are under the age of 21.
- Individuals in medication treatment for OUD.

Center on Rural Addiction
UNIVERSITY OF VERMONT

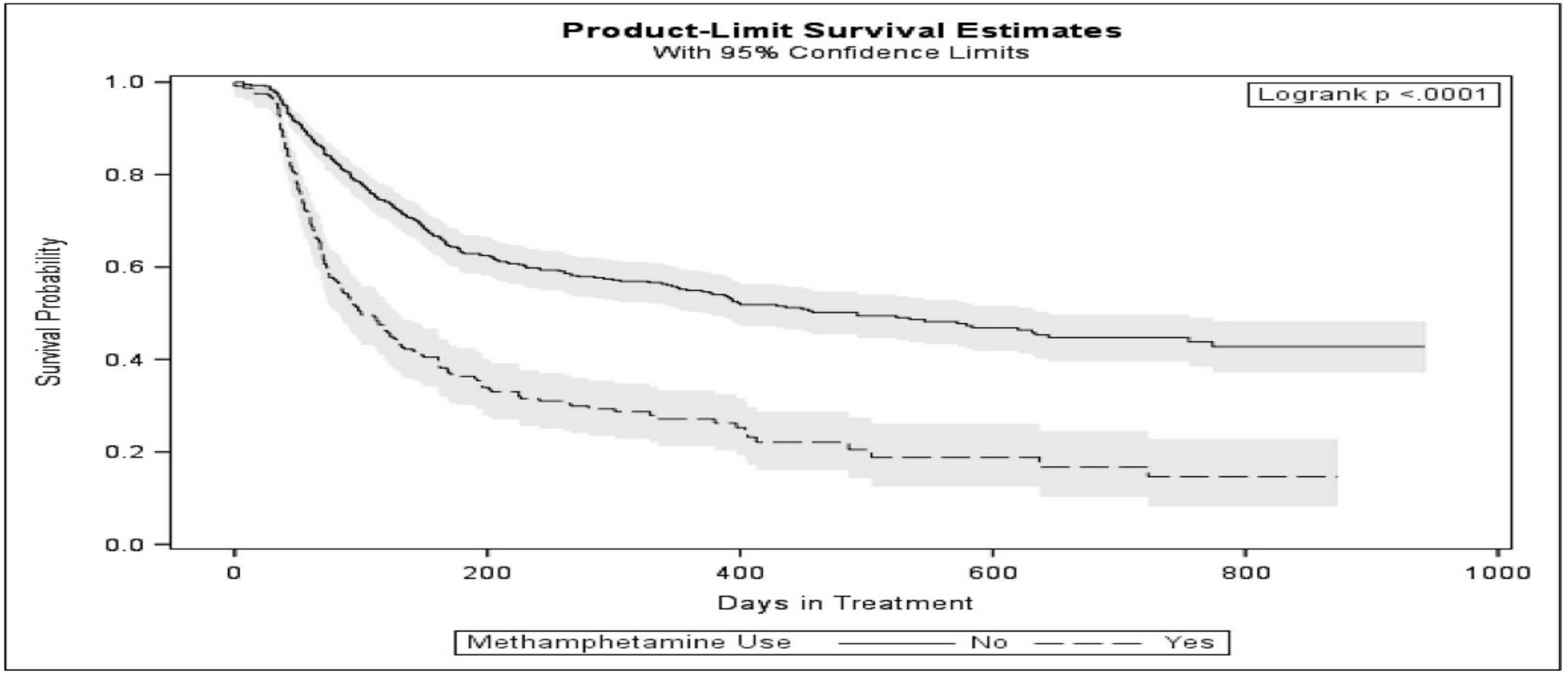
Association Between Methamphetamine Use and Retention Among Patients With Opioid Use Disorders Treated With Buprenorphine. Tsui, et al (2020)

- The study utilized data on adult patients receiving buprenorphine from Washington State Medication Assisted Treatment-Prescription Drug and Opioid Addiction program clinics between November 1, 2015, and April 31, 2018 (N=799). Past 30-day substance use data were collected at baseline, 6-months, and date of program discharge.

- 30% (n=237) of individuals reported meth use at admission. Baseline methamphetamine use was associated with more than twice the relative hazards for discharge in adjusted models (aHR=2.39; 95% CI: 1.94–2.93).

Center on Rural Addiction
UNIVERSITY OF VERMONT

Association Between Methamphetamine Use and Retention Among Patients With Opioid Use Disorders Treated With Buprenorphine



Center on Rural Addiction
UNIVERSITY OF VERMONT

Interest in Reducing Methamphetamine and Opioid Use among Syringe Services Program Participants in Washington State McMahan et al, 2020 Drug and Alcohol Dependence

- In a sample of 583 participants at a Washington State syringe exchange program (443 opioids; 140 methamphetamine), survey data were collected on their attitudes about stopping drug use.
- 82% of the individuals who reported opioids as their main drugg expressed an interest in reducing/stopping opioid use
- 46% of individuals who reported methamphetamine as their main drug expressed an interest in reducing/stopping their meth use.

Center on Rural Addiction
UNIVERSITY OF VERMONT

Harm Reduction Strategies

- Information about medical and psychiatric effects of meth
- Overdose Education (fentanyl)
- Syringe Exchanges
- Naloxone (for opioid overdose)
- Not using drugs alone
- Injection “testing”
- Injection “taking turns”
- Quiet rooms and wash up/shower rooms
- Condoms/safe sex education
- Topical antibiotic creams and ointments for injection sites

Center on Rural Addiction
UNIVERSITY OF VERMONT

Center on Rural Addiction
UNIVERSITY OF VERMONT

Treatment of Individuals with Stimulant Use Disorder

The ASAM/AAAP

CLINICAL PRACTICE GUIDELINE ON THE

Management of Stimulant Use Disorder

ASAM American Society of Addiction Medicine

AAP American Academy of Addiction Psychiatry

Center on Rural Addiction
UNIVERSITY OF VERMONT

Clinical Guideline Committee (CGC) Members; ASAM Team; AAAP Team; IRETA Team. The ASAM/AAAP Clinical Practice Guideline on the Management of Stimulant Use Disorder. J Addict Med. 2024 May-Jun 01;18(1S Suppl 1):1-56. doi: 10.1097/ADM.0000000000001299. PMID: 38669101; PMCID: PMC11105801.

Center on Rural Addiction
UNIVERSITY OF VERMONT

Current Status of Treatment Approaches for Methamphetamine Use Disorder

- **Contingency management unanimously (7 systematic reviews and meta-analyses) found to have the most robust evidence of effectiveness**.
- Other approaches with lesser but evidence of support: Cognitive Behavioral Therapy (CBT) and Community Reinforcement Approach (CRA)
- Approach with evidence for treatment of a broad variety of SUD: Motivational Interviewing (MI).
- Approach with recent studies showing benefit to individuals with methamphetamine use disorder: Physical Exercise (PE). (e.g. Rawson et al, 2015)

Center on Rural Addiction
UNIVERSITY OF VERMONT

Contingency Management

A technique employing the systematic delivery of positive reinforcement for desired behaviors. In the treatment of methamphetamine dependence, vouchers or prizes can be "earned" for submission of methamphetamine-free urine samples or for attendance at treatment sessions.

Recovery Incentives: California's Contingency Management Benefit

Thomas E. Freese, PhD
UCLA Integrated Substance Abuse Programs

Recovery Incentives: California's Contingency Management Pilot: Overview

- The California CM Pilot is the first large-scale implementation of CM for treating stimulant use disorder outside the Department of Veterans Affairs (VA).
- This project is the first implementation of CM to be approved to be covered under Medicaid as part of the CalAIM 1115 Demonstration.
- CM implementation will require a very new set of procedures and knowledge and skills.
- The successful use of CM will require the implementation of a very specific protocol/methodology.
- All providers/personnel delivering CM will be required to vigorously follow the procedures of the protocol.
- The methods of delivering and accounting for incentives will be very similar to procedures used for dispensing medications.

Center on Rural Addiction
UNIVERSITY OF VERMONT

Key Elements of the Recovery Incentives Program

Participate in a structured **24-week Recovery Incentives Program**. 12 weeks with twice weekly testing/incentives and a 12-week continuation with once weekly testing/incentives

Receive incentives for testing **negative for stimulants only** even if they test positive for other drugs

Earn a **maximum of $599** over the 24-week period in the form of gift cards

Generate incentives and track progress using **Incentive Manager** software

Center on Rural Addiction
UNIVERSITY OF VERMONT

Training and Implementation Support

01

Overview (2-hours – self-paced)

02

Implementation (6-hours live virtual)

03

Readiness Self study, Interview, Practice Cases

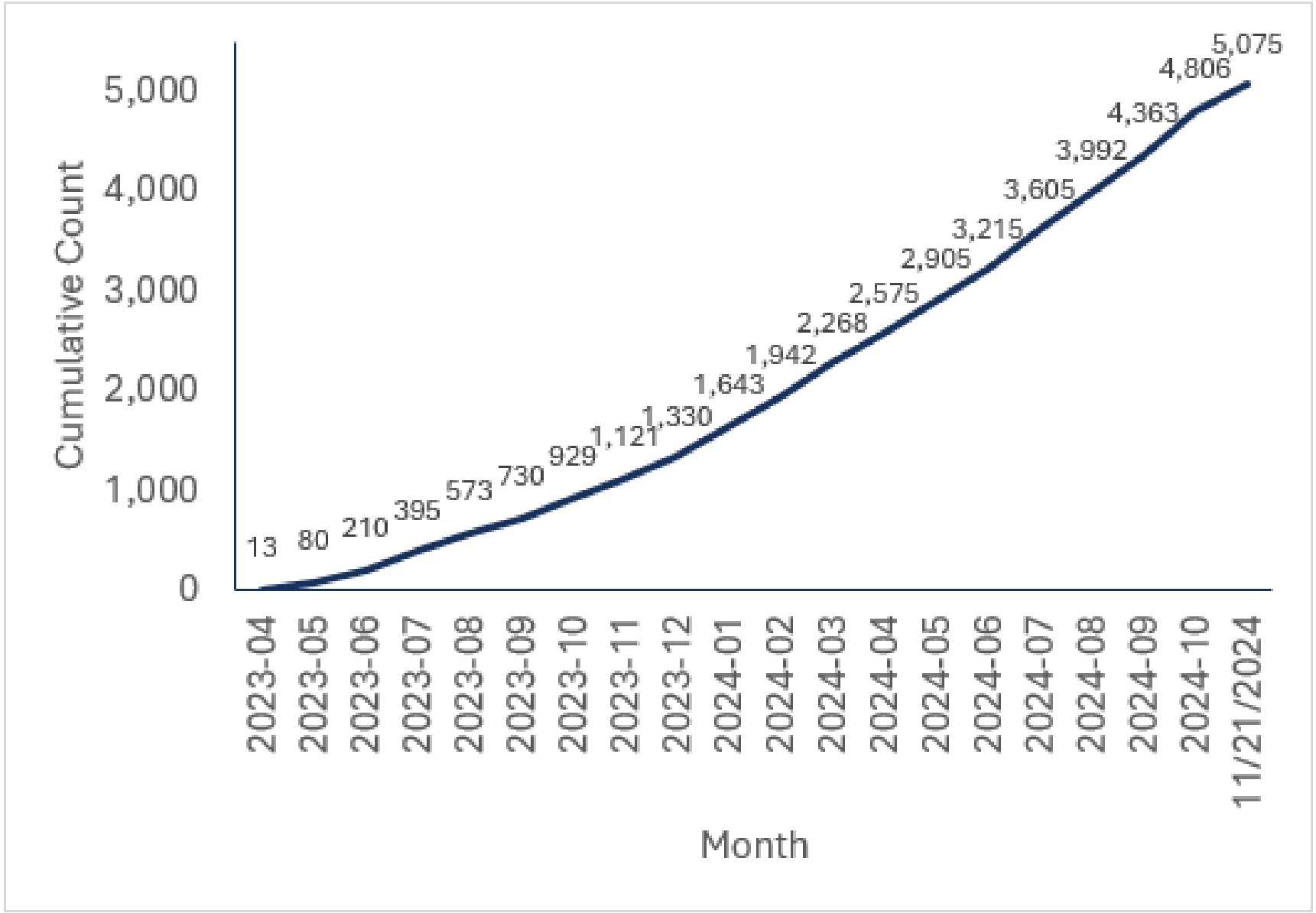
04

Monthly Coaching Implementation Zoom Sessions

05

Fidelity Monitoring (2x first 6 mo, 1x every 6 mo after)

Recruitment into Recovery Incentives Program



Center on Rural Addiction
UNIVERSITY OF VERMONT

Recovery Incentives: Results to Date
Retention (Data Cut as of Feb 28, 2024)

As of the time of the data cut, **647 people** had the opportunity to complete 24 weeks of the Recovery Incentive Program. Participant Response:

- **EXCELLENT** RESPONSE: COMPLETED 24 WEEKS: 150 / 647 = **23.2%**
- **POSITIVE** RESPONSE: COMPLETED 12 WEEKS; LESS THAN 24 WEEKS: 262/647 = **40.5%**
- **PARTIAL** RESPONSE: 30 DAYS BUT LESS THAN 12 WEEKS: 181/647 = **28.0%**
- **NONRESPONDERS**: ONE SESSION BUT LESS THAN 30 DAYS: 54/647 = **8.3%**

Urine Drug Test Stimulant Results

% Negative Test Results
Among all submitted tests

96%

% Negative Test Results
Conservatively treating unexcused absences like stimulant-positive tests:

74%

(True number is between 74% and 96%)

More Client Survey Results: TEA Data

As a result of the program:

Has your health improved?
94% Better/Much Better

How much better are you at taking care of personal responsibilities?
97% Better/Much Better

Are you a better member of the community?
97% Better/Much Better

Incentives Help With The Day-To-Day in Recovery

(I was) starving and it (the Recovery Incentives Program gift card) helped me eat.

Gift cards supplemented the necessities I needed to have in order to have the basics in life (underwear, toilet paper, shoes)

(Helped) reduce stress early in my recovery

I was able to get things that I didn't have to steal. I was able to buy food and clothes and be happy about not going to the store to steal something.

Incentives Work for People Who Had Struggled Before

I've been in drug treatment programs since I was 16 years old. I'm 43 years old now. And I had never passed a drug test—until I started here!

I feel and look healthier, my mind is clear, and I am starting to feel human again!

I'm no longer stealing, running around late hours of the night committing crimes. I'm now paying taxes and helping out in the community.

Center on Rural Addiction
UNIVERSITY OF VERMONT

Exercise as a Treatment Intervention for Methamphetamine Dependence

Center on Rural Addiction
UNIVERSITY OF VERMONT

Study Interventions

- Participants randomized to 1 hour, 3 d/wk of exercise training (EX) or education (ED) over the 8-wk study period (24 sessions)
- **EX**: 5 minutes warm-up followed by 30 minutes aerobic exercise on treadmill at 65%-85% max heart rate, followed by 15 minutes circuit-style resistance training of major muscle groups, 5 minute cool-down (light stretching)
- **ED**: equal attention via health and wellness education sessions delivered by counselor. Topics include nutrition, health screening, meditation, acupressure, dental care, stress relief

Center on Rural Addiction
UNIVERSITY OF VERMONT

Exercise Summary

For individuals in the first 100 days of meth recovery, exercise:

- Improves physical conditioning
- Reduces weight gain
- Improves cardiovascular functioning (increases heart rate variability)
- Reduces symptoms of anxiety and depression
- Reduces craving for methamphetamine
- Enhances recovery of dopamine system
- Reduces relapse to methamphetamine post discharge (except in very heavy users)

Center on Rural Addiction
UNIVERSITY OF VERMONT

Exercise References

1. Mooney, L.J., Cooper, C., London, E.D., Chudzynski, J., Dolezal, B., Dickerson, D., Brecht, M.-L., Peñate, J., & Rawson, R.A. (2013). Exercise for methamphetamine dependence: Rationale, design, and methodology. *Contemporary Clinical Trials, 37*(1), 139-147. doi: 10.1016/j.cct.2013.11.010. PMCID: PMC4431553

2. Rawson, R.A., Chudzynski, J., Gonzales, R., Mooney, L., Dickerson, D., Ang, A., Dolezal, B., & Cooper, C.B. (2015). The impact of exercise on depression and anxiety symptoms among abstinent methamphetamine-dependent individuals in a residential treatment setting. *Journal of Substance Abuse Treatment, 57*, 36-40. doi:10.1016/j.jsat.2015.04.007. PMC4560957

3. Haglund, M., Ang, A., Mooney, L., Gonzales, R., Chudzynski, J., Cooper, C.B., Dolezal, B.A., Gitlin, M., & Rawson, R.A. (2015). Predictors of depression outcomes among abstinent methamphetamine-dependent individuals exposed to an exercise treatment. *American Journal on Addictions, 24*(3), 246-251. doi: 10.1111/ajad.12175.

4. Rawson, R.A., Chudzynski, J., Mooney, L., Gonzales, R., Ang, A., Dickerson, D., Penate, J., Salem, B.A., Dolezal, B., & Cooper, C.B. (2015). Impact of an exercise intervention on methamphetamine use outcomes post-residential treatment care. *Drug and Alcohol Dependence, 156*, 21-28. PMCID: PMC4633370. doi: 10.1016/j.drugalcdep.2015.08.029.

5. Robertson, C.L., Ishibashi, K., Chudzynski, J., Mooney, L.J., Rawson, R.A., Dolezal, B.A., Cooper, C.B., Brown, A.K., Mandelkern, M.A., & London, E.D. (2016). Effect of exercise training on striatal dopamine D2/D3 receptors in methamphetamine users during behavioral treatment. *Neuropsychopharmacology, 41*(6), 1629-1636. doi: 10.1038/npp.2015.331. PMCID: PMC4832026 [Available May 1, 2017]

6. Salem, B.A., Gonzales-Castaneda, R., Ang, A., Rawson, R.A., Dickerson, D., Chudzynski, J., Penate, J., Dolezal, B., Cooper, C.B., & Mooney, L.J. (2022). Craving among individuals with stimulant use disorder in residential social model-based treatment – Can exercise help? *Drug and Alcohol Dependence, 231*, 109247.

Center on Rural Addiction
UNIVERSITY OF VERMONT

Medications

Center on Rural Addiction
UNIVERSITY OF VERMONT

Medications for Cocaine Use Disorder

*Medications with positive studies and under consideration.

topiramate*
modafinil*
bupropion*
amphetamine salts
disulfiram (mixed, worse retention)
propranolol (WD)
buprenorphine+naltrexone

Center on Rural Addiction
UNIVERSITY OF VERMONT

Medications for Methamphetamine Use Disorder

Medications with positive studies and under consideration

*bupropion/naltrexone
* mirtazapine

bupropion
naltrexone
methylphenidate
d-amphetamine
topiramate

Center on Rural Addiction
UNIVERSITY OF VERMONT

Questions?

RRAWSON@mednet.ucla.edu

alhasson@ucla.edu