

Making a Transformation (MAT) Conference 2024

The Impact of Stimulants on Brain, Body, and Behavior and Using Contingency Management to Treat Stimulant Use Disorder

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Disclosures

None of the presenters, planners, or others in control of content for this educational activity have relevant financial relationships to disclose with ineligible companies whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients.

Learning Objectives

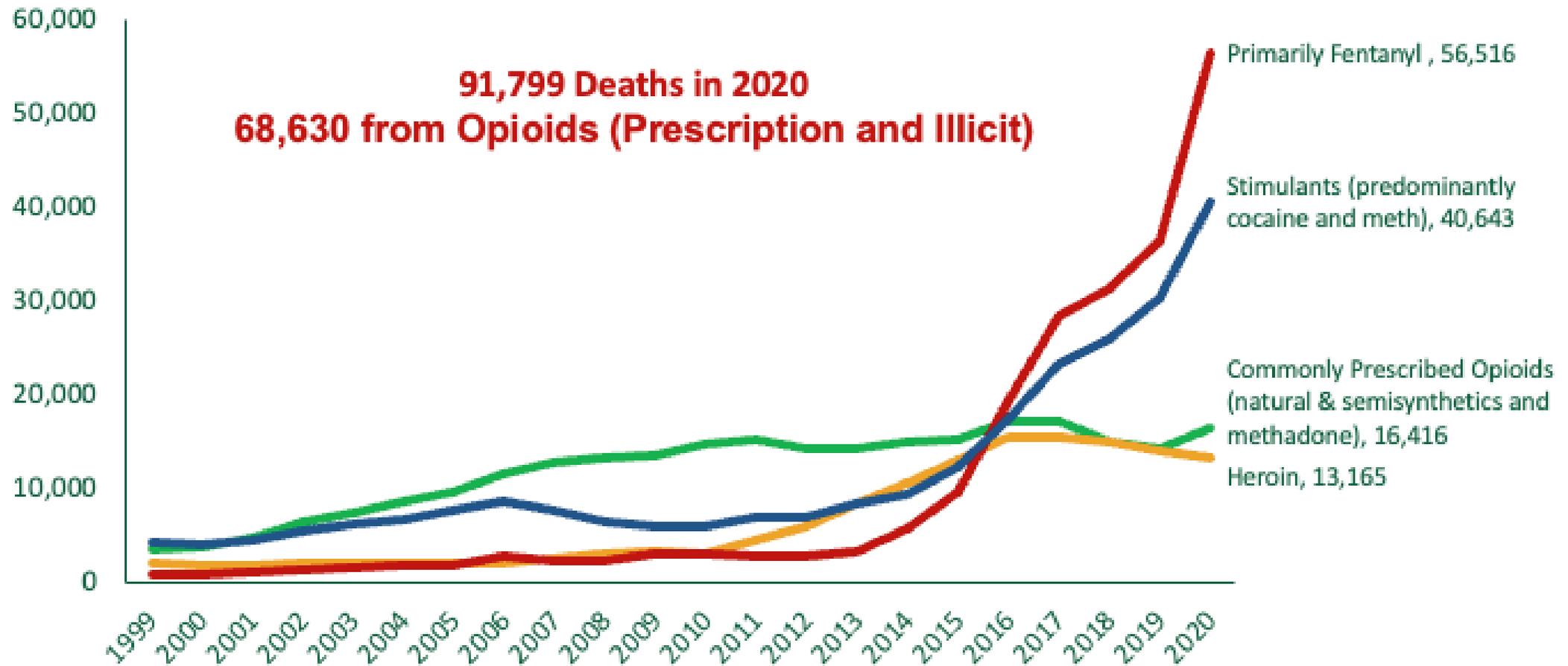
- » Describe at least three (3) patterns and trends regarding the scope of stimulant use in the Western U.S. and beyond.
- » Identify at least three (3) acute and three (3) chronic effects of psychostimulant drugs on the brain.
- » Formulate a list of the four (4) essential elements of an evidence-based, protocol-driven contingency management program to address stimulant use.
- » Specify two (2) barriers to implementing contingency management and two (2) strategies to address the barriers.

A Focus on Stimulants

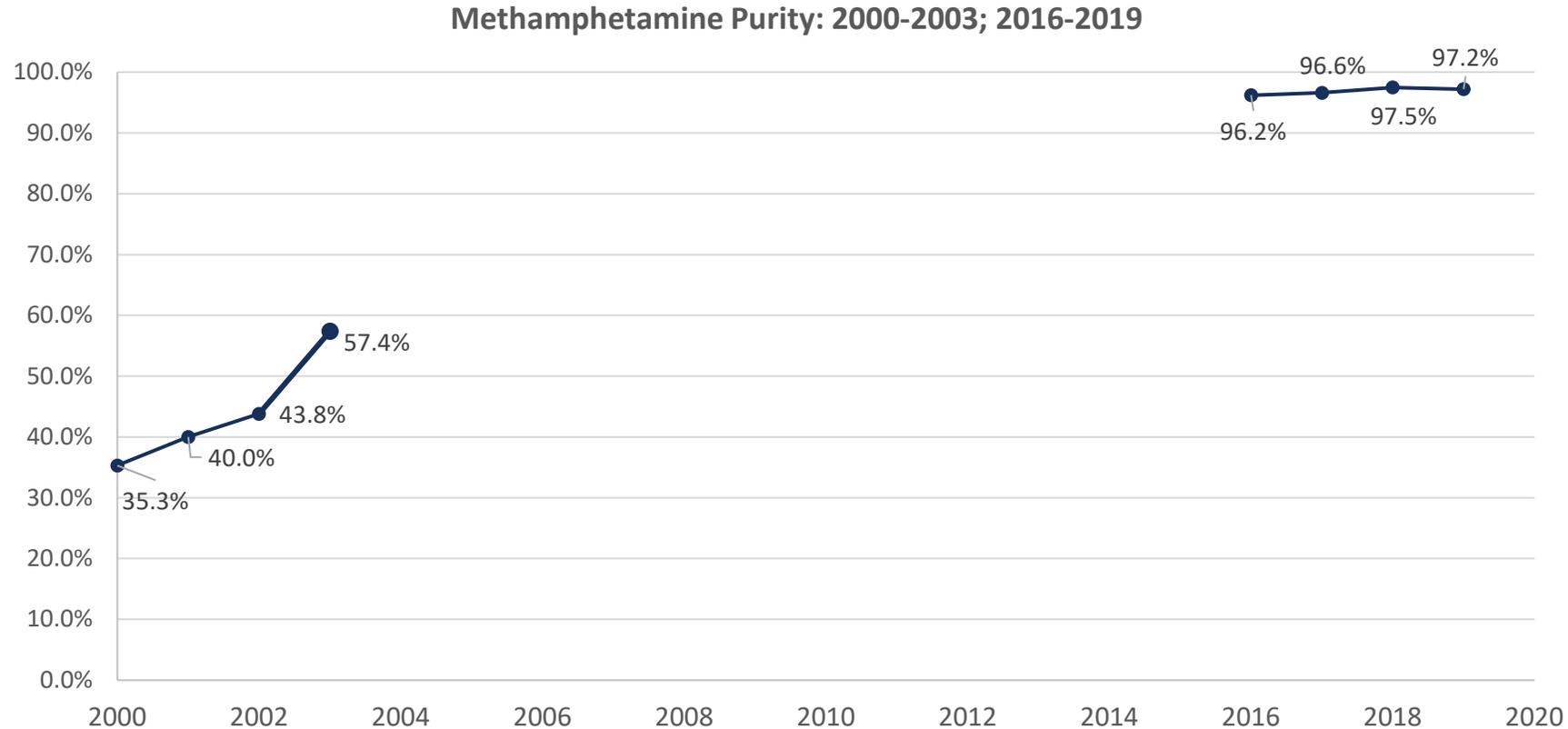


Evolution of Drivers of Overdose Deaths, All Ages

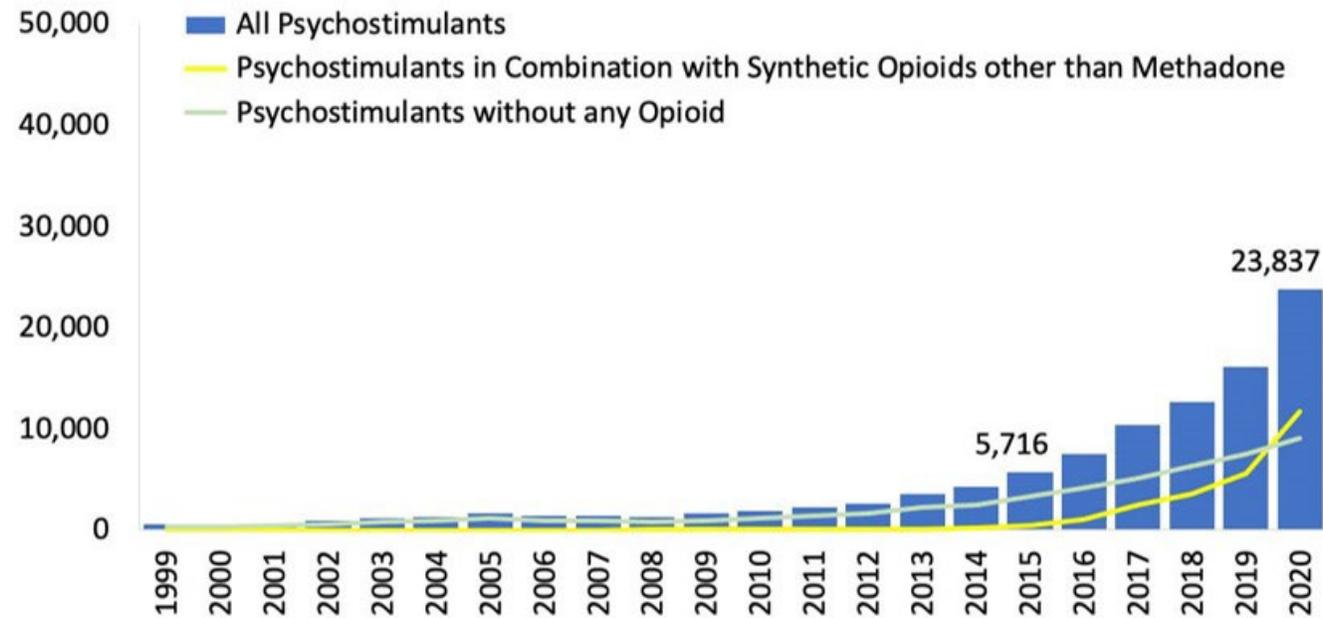
Analgesics → Heroin → Fentanyl → Stimulants



Methamphetamine Purity 2000-2003 vs. 2016-2019



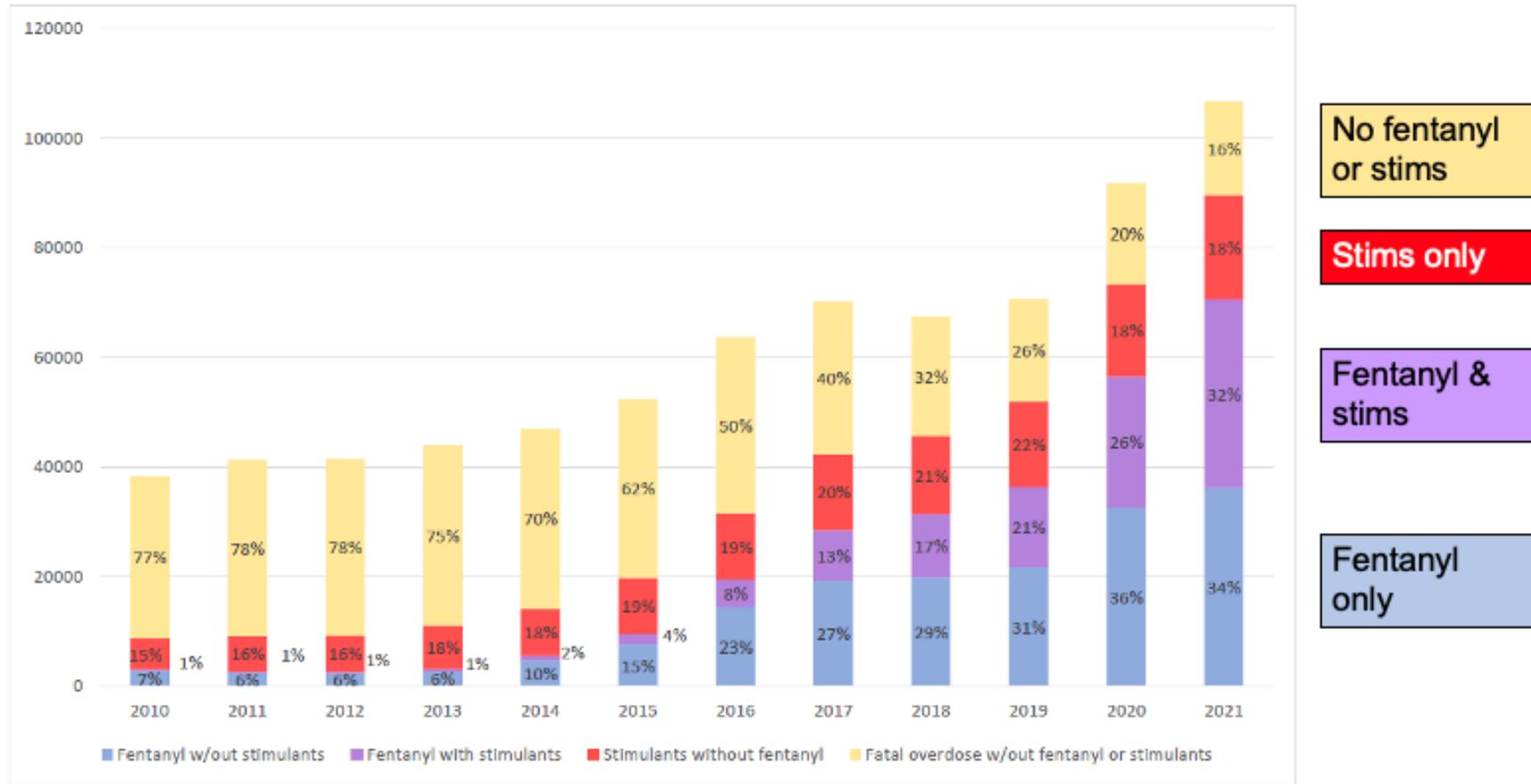
National Overdose Deaths Involving Psychostimulants with Abuse Potential (Primarily Meth)*, by Opioid Involvement



*Among deaths with drug overdose as the underlying cause, the psychostimulants with abuse potential (primarily methamphetamine) category was determined by the T43.6 ICD-10 multiple cause-of-death code. Abbreviated to *psychostimulants* in the bar chart above. Source: Centers for Disease Control and Prevention, National Center for Health Statistics. Multiple Cause of Death 1999-2020 on CDC WONDER Online Database, released 12/2021.

Results

Overdose Deaths by Fentanyl and Stimulant Presence, 2010-2021



Friedman & Shover, 2022

Meta-Analysis of Substance Targeted and Dropout Rates

Treatment Target	Dropout Rate
Heroin	25.1%
Tobacco	25.5%
Alcohol	26.1%
Cocaine	48.7%
Methamphetamine	53.5%

Acute *Physical* and *Psychological* Effects of Stimulants

Increases

- Heart rate
- Blood pressure
- Pupil size
- Respiration
- Sensory acuity
- Energy
- Confidence
- Alertness
- Mood/Euphoria
- Sex drive
- Energy
- Talkativeness

Decreases

- Appetite
- Sleep
- Reaction Time
- Boredom
- Loneliness
- Timidity

Chronic *Physical* and *Psychological* Effects of Stimulants

- Tremor
- Weakness
- Dry mouth
- Weight loss
- Cough
- Sinus infection
- Dental Problems
- Sweating
- Burned lips; sore nose
- Oily skin/complexion
- Headaches
- Diarrhea
- Anorexia
- Confusion
- Concentration
- Hallucinations
- Fatigue
- Memory loss
- Insomnia
- Irritability
- Paranoia
- Panic reactions
- Depression
- Anger
- Psychosis

More on the Effects of Chronic Stimulant Use

Organ system damage

- **Respiratory** (pulmonary hypertension, difficulty breathing, pleuritic chest pain, decreased capacity)
- **Neurological** (stroke, seizure, hemorrhage, cerebral vasculitis)
- **Renal failure** (resulting from rhabdomyolysis)
- **Hepatic failure** (resulting from rhabdomyolysis)
- **Cardiac** (tachycardia, arrhythmia, reduced heart rate variability, myocardial infarction, heart failure)

Psychological Effects

- **Psychosis** (hallucinations, delusions)
- **Affective** (depression, suicidal ideation, mania)

Acute Stimulant Overdose

- Severe hyperthermia
- Convulsions
- Severe dehydration
- Anxiety/panic
- Paranoia
- Delirium
- Rhabdomyolysis → acute renal failure
- Stroke
- Myocardial infarction



A Focus on Contingency Management

Currently, there are no FDA-approved medications for treating individuals with stimulant use disorder

Contingency Management for Treating Stimulant Use Disorder

A behavioral technique employing the **systematic delivery** of **positive reinforcement** for desired behaviors that are incompatible with stimulant use. In the treatment of stimulant use disorder, tangible items (e.g. gift cards) can be “earned” for submission of **stimulant-free urine samples** or for completion of other selected behaviors.

Types of Learning/Conditioning

» Classical conditioning

- Association between a stimulus and a response
- In substance use, this explains the development of “triggers”, which are stimuli that produce a conditioned response (thoughts/cravings of the substance)

» Operant conditioning

- Positive reinforcement (increases targeted behavior)
- Negative reinforcement (increases targeted behavior)
- Punishment (decreases targeted behavior)

» Contingency Management utilizes ***positive reinforcement***

Operant Conditioning

Behavior → Consequence → Behavior Change

	Reinforcement (Increase / maintain behavior)	
Positive (add stimulus)	Add pleasant stimulus to Increase / maintain behavior	The euphoria and any other pleasant experiences while high (i.e., sex) positively reinforce substance use
Negative (remove stimulus)	Remove aversive stimulus to Increase / maintain behavior	Withdrawal symptoms are experienced as unpleasant and increase substance use because using makes them go away

Reinforcement vs. Punishment

- » Both can change behavior
- » Most people prefer reinforcement over punishment
- » Punishment does not teach a new behavior (only tells you what *not* to do)
- » Most punishers lack the immediacy to be effective
- » Punishment has unnecessary side effects, i.e., reduced self-esteem
- » Only positive reinforcement teaches new behaviors in a way that builds self esteem, and self-efficacy

Punishment



Positive Reinforcement



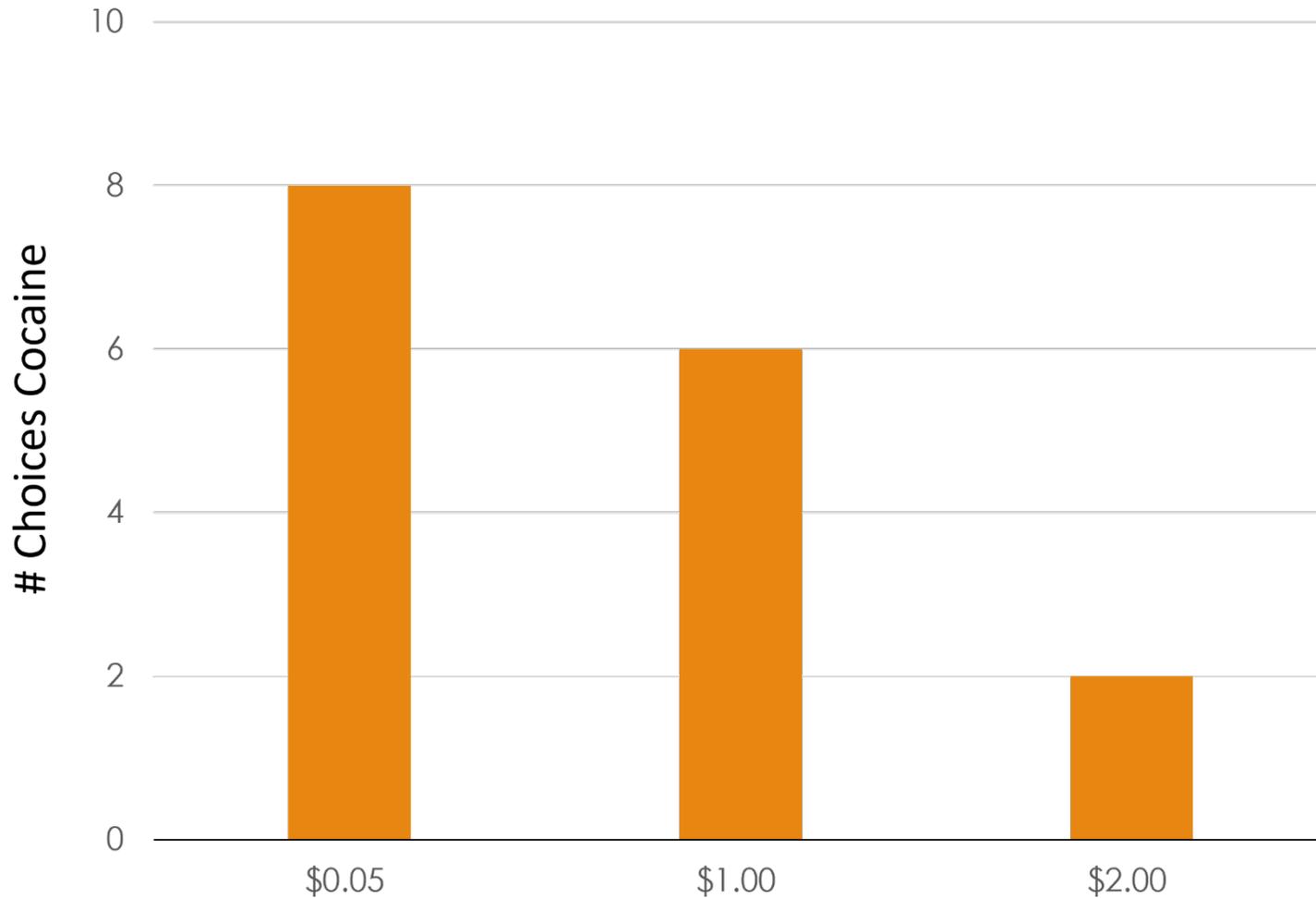
CM Uses Positive Reinforcement to Help People Choose Abstinence Over Substance Use

- » CM uses tangible incentives (i.e., gift cards).
- » Incentives (i.e., gift cards) are only provided when a UDT is negative for stimulant drugs (e.g., cocaine, amphetamine and methamphetamine).
- » Rewards (i.e., gift cards) increase, or escalate, over time when the stimulant abstinence is consistently achieved.

What CM Is and Is Not

CM is <i>NOT</i> ...	CM is...
A candy bowl on your desk	Purposeful; done with skill-based on set of key principles
Providing people with services, resources, help, or charity	An intervention that leverages positive reinforcement in a particular way
“Paying people not to use”	An intervention that: <ul style="list-style-type: none">• Builds confidence• Enhances morale for participants and staff• Improves therapeutic relationships• Creates opportunities to celebrate• Can help people reduce stimulant use

Cocaine vs. Reward



People who use drugs will choose relatively small rewards over drugs

CM for Stimulants: Research Summary (1)

- » CM is the most effective way to help people stop using stimulant drugs (AshaRani et al., 2020; Bentzley, et al., 2021)
- » Over 60 studies demonstrating that CM works to reduce stimulant use for people who are receiving MOUD (Medications for Opioid Use Disorder) treatment (Bolívar et al., 2021)
- » CM has a higher retention rate than other stimulant use disorder treatments (Higgins et al., 1994)
- » The effects of CM can last for up to one year after the intervention ends (Ginley et al., 2021)
- » CM that targets stimulant abstinence leads to reduced alcohol use, cigarette smoking, depressive symptoms, and psychiatric hospitalizations (Miguel et al., 2017; McDonell et al., 2021b)
- » CM is cost effective (Olmstead & Petry, 2009)

CM for Stimulants: Research Summary (2)

Cultural factors:

- CM has demonstrated efficacy in the U.S., Brazil, China, and other countries (Hser et al., 2011; Miguel et al., 2022)
- CM has been adapted, tested, and found to be effective in partnership with American Indian and Alaska Native communities (McDonnell et al., 2021a; McDonnell et al., 2021b)
- CM has demonstrated efficacy for reducing methamphetamine use among Men Who Have Sex With Men (MSM) (Shoptaw et al., 2006)

Other Populations:

- CM is associated with reductions in substance use in populations with co-occurring serious mental illness (McDonnell et al., 2013; Bellack et al., 2006)

SOURCES: Bellack et al., 2006; Hser et al., 2011; McDonnell et al., 2013; McDonnell et al., 2021a; McDonnell et al., 2021b; Miguel et

The Four Essential “Ingredients” of CM

1. Clearly define a single behavior
2. Frequently measure behavior
3. Provide tangible incentives soon after behavior is observed
4. Withhold incentive when behavior is not observed while ***maintaining supportive attitude***



1. Clearly Define the Behavior Goal

Goal: Stimulant abstinence measured by point-of-care Urine Drug Test (UDT)

- **Focused:** does not require abstinence from other substances, only stimulants
- **Objective:** does not rely on self-report, relies on UDTs
- **Immediate results:** essential for positive reinforcement
- **Feasible:** cost effective for frequent use, does not take specialized training
- **Achievable:** a 2 to 4-day stimulant metabolite detection window means rewards can be earned within first few days of abstinence

2. Frequently Measure the Behavior

» Collect urine tests and provide incentives:

- Ex: **2 x per week for weeks 1-12**
- Ex: **1 x per week for weeks 13-24**



» Communicate attendance requirements (missed visit means missed opportunity for reward and reset of recovery incentive value to baseline)

» Schedule on non-sequential days (e.g., Mon/Thurs or Tues/Fri)

3. Provide Desirable/Immediate Rewards

Desirable:

- An Incentive Manager vendor can provide a wide array of options for incentives
- Starting value of \$10 per stimulant-negative UDT, increasing by \$1.50 for every week of non-use of stimulants (i.e., two consecutive stimulant-negative UDTs)

Immediate:

- Incentives can be electronically delivered, with the option to print gift cards onsite for those without reliable access to technology

4. Contingent AND Positive

Contingent:

- No incentive given when urine test is not submitted or is positive for stimulants

Positive:

- Encouragement/support is offered without punishment even if the urine drug test is positive for stimulants

Core CM Element

Escalation, Reset, and Recovery

- » Initial incentive value for first sample negative for stimulants in a series is \$10. For each week the member demonstrates non-use of stimulants (2 consecutive (-) UDTs), the value of the incentive is **increased by** \$1.50.
- » A “**reset**” will occur when a member submits a positive sample or has an unexcused absence. The next time a (-) UDT is submitted, the incentive amount will return to the initial value (i.e., \$10)
- » A “**recovery**” of the pre-reset value will occur after two consecutive stimulant (-) urine samples. At that time, the member will recover their previously earned incentive level without having to restart the process.

Full Incentive Schedule with 100% Stimulant-Negative UDTs

Week	Incentive 2x/week (\$)	Weekly Total (\$)
1	\$10.00 + \$10.00	\$20.00
2	\$11.50 + \$11.50	\$23.00
3	\$13.00 + \$13.00	\$26.00
4	\$14.50 + \$14.50	\$29.00
5	\$16.00 + \$16.00	\$32.00
6	\$17.50 + \$17.50	\$35.00
7	\$19.00 + \$19.00	\$38.00
8	\$20.50 + \$20.50	\$41.00
9	\$22.00 + \$22.00	\$44.00
10	\$23.50 + \$23.50	\$47.00
11	\$25.00 + \$25.00	\$50.00
12	\$26.50 + \$26.50	\$53.00
Total		\$438.00

Week	Incentive 1x/week (\$)	
13	\$15.00	
14	\$15.00	
15	\$15.00	
16	\$15.00	
17	\$15.00	
18	\$15.00	
19	\$10.00	
20	\$10.00	
21	\$10.00	
22	\$10.00	
23	\$10.00	
24	\$21.00	
Total	\$161.00	\$599.00

CM and Safe Harbor Requirements (1)

- » Under the OIG Safe Harbor requirements, use of recovery incentives as part of treatment may *not* be advertised
- » Document need for CM showing that the client has a moderate or severe StimUD
- » Use a research-based Recovery Incentive Program (the exact details will be provided in the 2-part Implementation Training)
- » Carefully document that recovery incentives are linked to client outcomes
 - *Must closely document each UDT result and the corresponding recovery incentive that was given for that negative test*

CM and Safe Harbor Requirements (2)

- » Regularly evaluate the impact of CM on client outcomes
 - *Do quality improvement to document CM effectiveness (more on this in Implementation Training)*

- » Avoid tying CM visit with another Medi-Cal/Medicare billable encounter

- » **Some of these rules will be modified according to DHCS guidance for the Recovery Incentives Program in California since it being conducted as a Medi-Cal benefit; details will be provided in the Implementation Training**

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



The CM Coordinator

- » The key to the successful implementation is the CM Coordinator.
- » Individuals trained as CM Coordinators will be the only individuals to conduct CM-related activities.
- » CM Coordinators will be regularly audited by a CM Supervisor.
- » The project will require buy-in and oversight of agency/county leadership.
- » All staff will participate in promoting recruitment of patients with StimUD into the CM pilot.

Additional CM Team Members

- » CM Coordinator
- » Back-up CM Coordinator
- » CM Supervisor
- » County Auditor
- » Other Important Team Members
 - Counselor to provide other behavioral treatments
 - Care manager
 - Recovery support provider/referrals
 - Medical care/referrals
 - Other service providers as needed

Urine Drug Testing Vendor Recommendations

- » UCLA worked with an expert toxicologist to develop a list of recommended products that met a standard set of requirements including cutoff levels and validity measures
- » Samples will be collected 2x per week in first 12 weeks; weekly in weeks 13-24
- » Point of care test cups will be utilized and immediate results for recent stimulant use will be obtained

Incentive Manager

- » DHCS intends to contract with an Incentive Manager vendor to manage the tracking and distribution of incentives to program participants. The Incentive Manager will have the ability to:
 - Calculate incentive amounts based on urine drug test results
 - Disburse incentives to program participants
 - Track incentive payment dates and amounts over time



The “WHY” Provider Perspectives on Implementing CM to Treat StimUD

Barriers to Facilitation

- » CLIA-Waiver requirements
- » Staffing/Hiring
- » Training to research levels of fidelity

Facilitators to Implementation

- » Standard research-based protocol
- » Flexible application of protocol at local sites
- » Start-up funding for sites
- » Rigorous training/implementation requirements

Questions?



Thank you for your time!

- » Thomas E. Freese, PhD – tfreese@mednet.ucla.edu
- » Beth A. Rutkowski, MPH – brutkowski@mednet.ucla.edu
- » Recovery Incentives Program Websites:
 - UCLA's Training/Implementation Support Materials: [Recovery Incentives Program: California's Contingency Management Benefit](#)
 - DHCS' CM Policy Website: [Recovery Incentives Program: California's Contingency Management Benefit](#)