



About Amphetamine Type Stimulants and Stimulant Use Disorder

Thomas E. Freese, PhD

Director, UCLA Integrated Substance Abuse Programs

Director of Training and Dissemination, Division of Addiction Psychiatry

Adjunct Professor, Psychiatry, David Geffen School of Medicine at UCLA

ISSUP Stimulant Webinar Series

23 January 2024, 11:00 AM WIB | 22 January, 2024 8:00 PM PST

The Scope of Stimulant Use in the United States and Beyond



ATTC

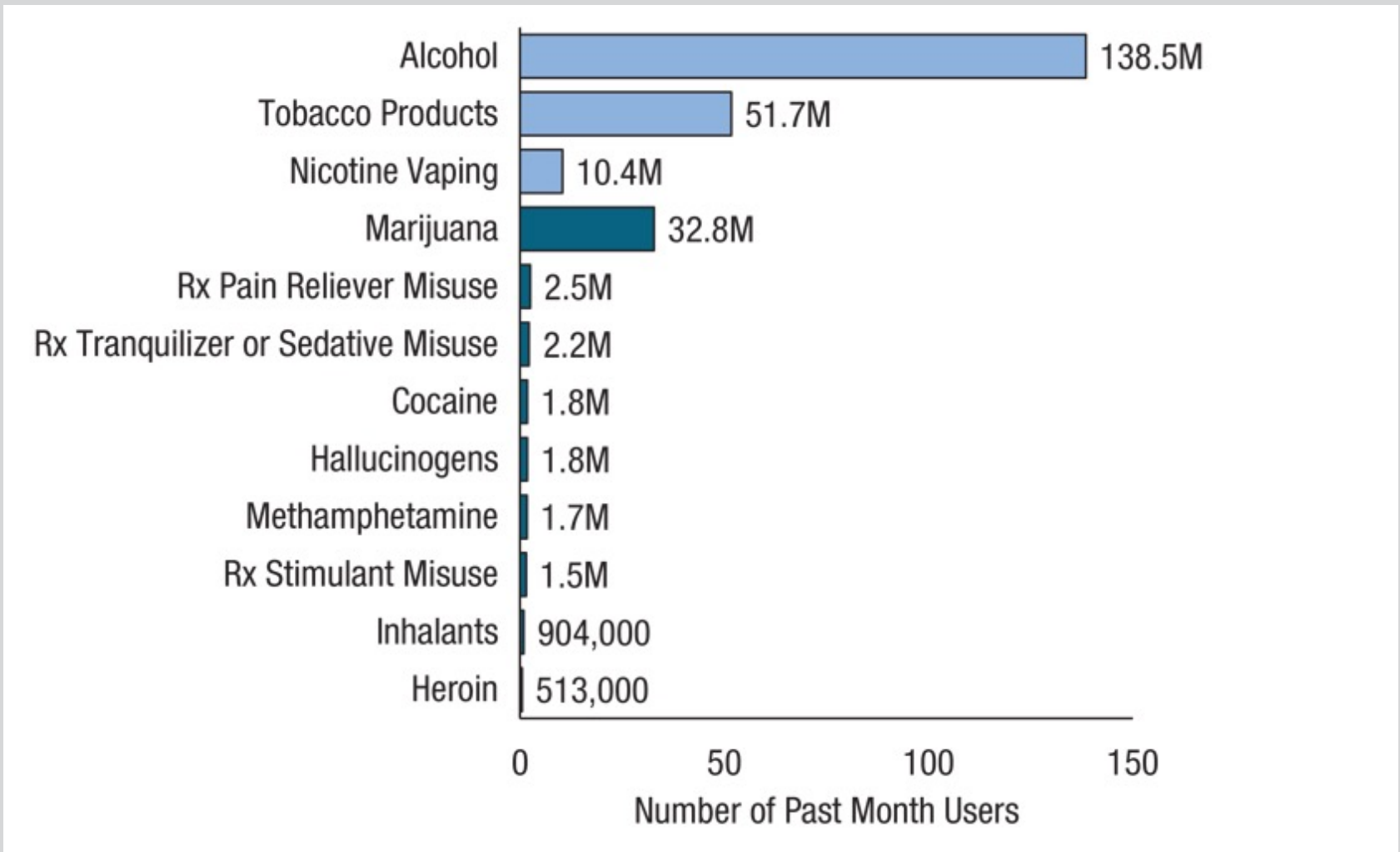
SAMHSA
Substance Abuse and Mental Health
Services Administration

What we know...globally



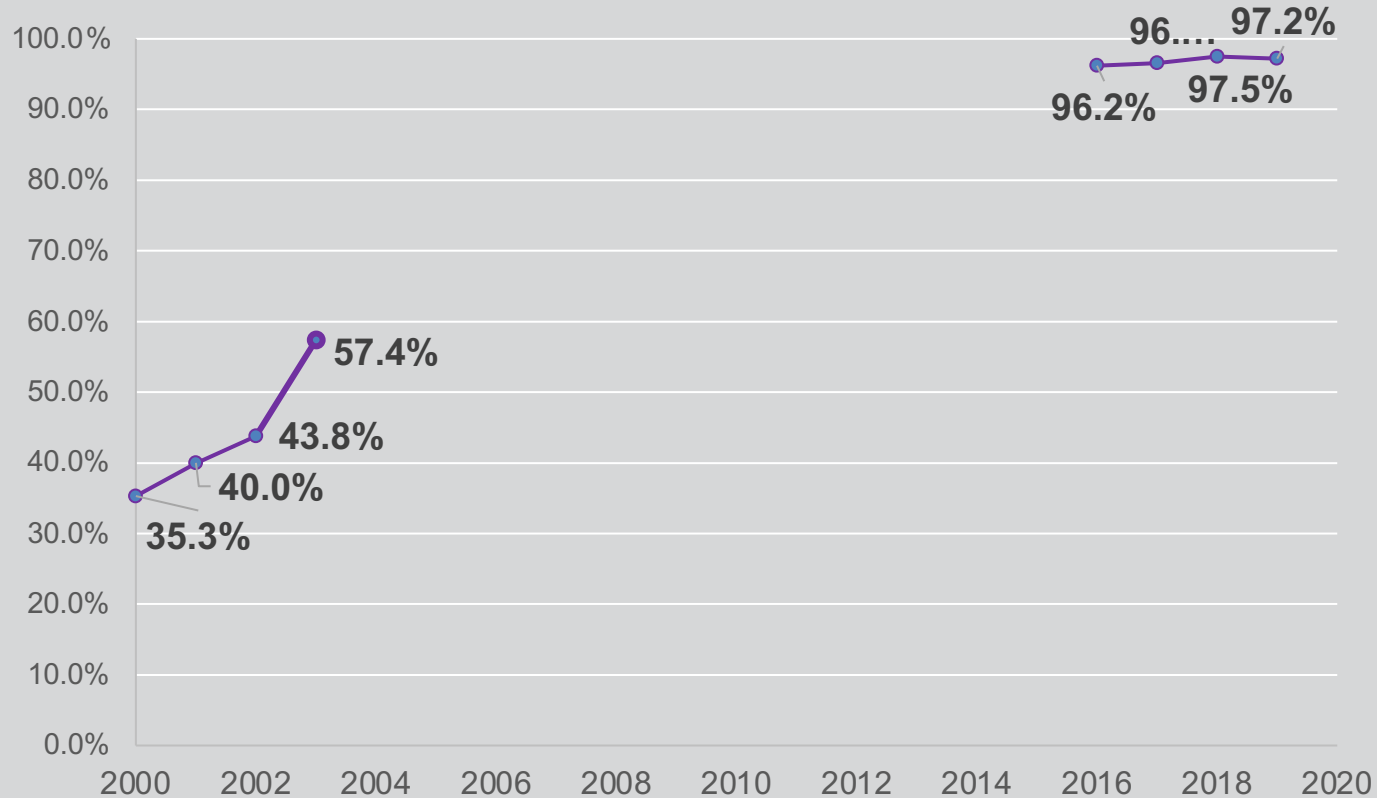
- Amphetamine-type stimulants (ATS) constitute the 3rd most widely used illicit drug category in the world, following cannabis and opioids
- The type of ATS used varies by region
 - Amphetamines in Europe and the Middle East
 - Methamphetamine in the US, Australia, and SE Asia
- Different precursors used in the manufacturing process

Numbers of People Reporting Past Month Substance Use among those Aged 12 or Older: 2020



SOURCE: SAMHSA, 2021

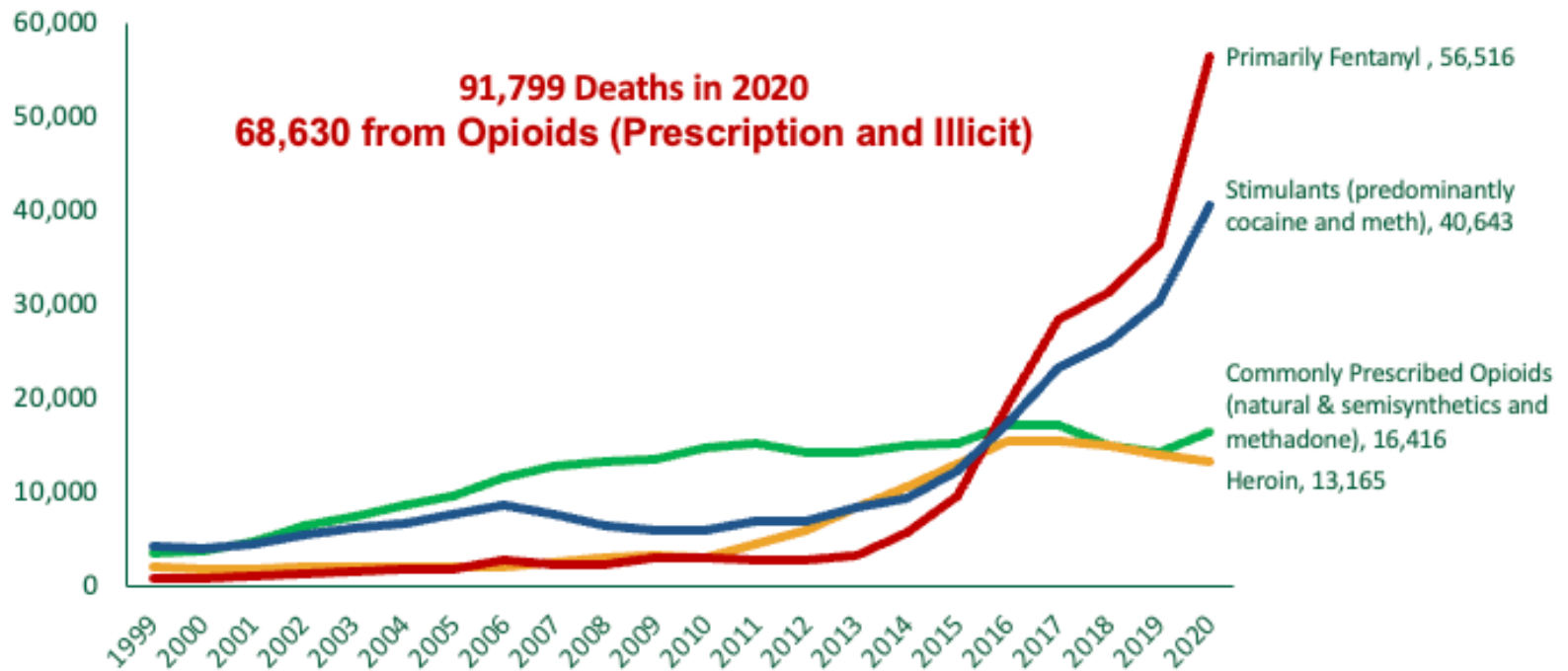
Methamphetamine Purity 2000-2003 vs. 2016-2019



SOURCE: Drug Enforcement Administration, 2021

Evolution of Drivers of Overdose Deaths, All Ages

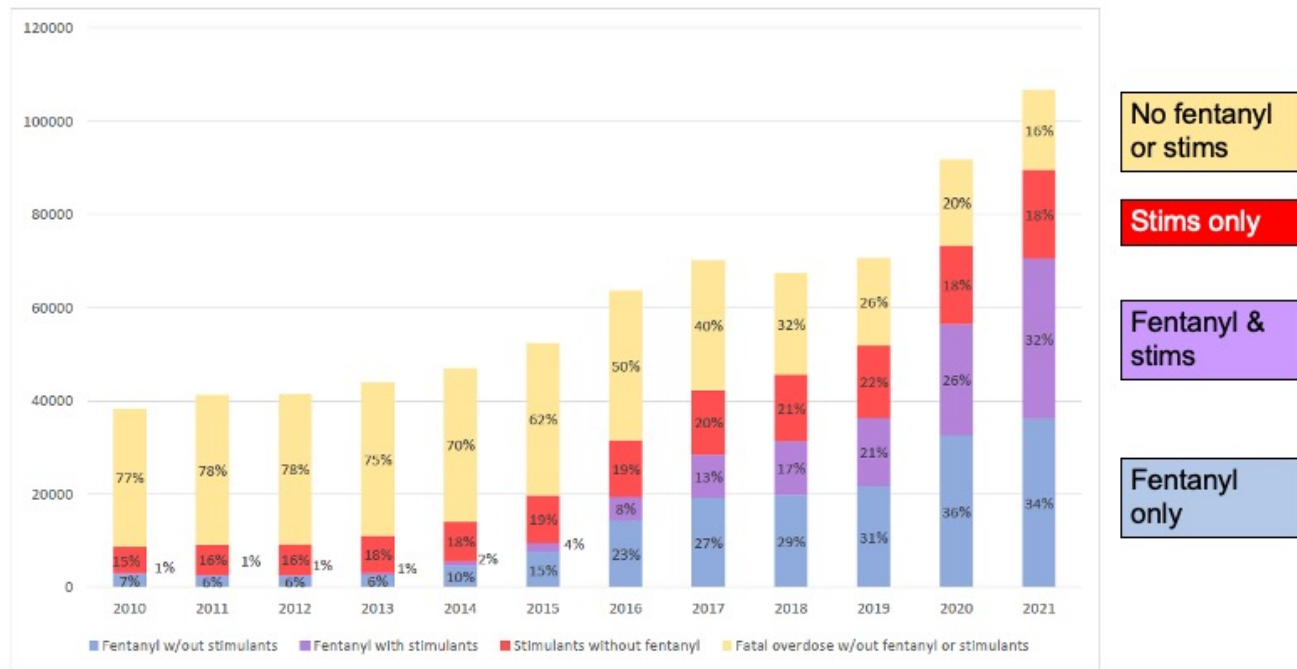
Analgesics → Heroin → Fentanyl → Stimulants



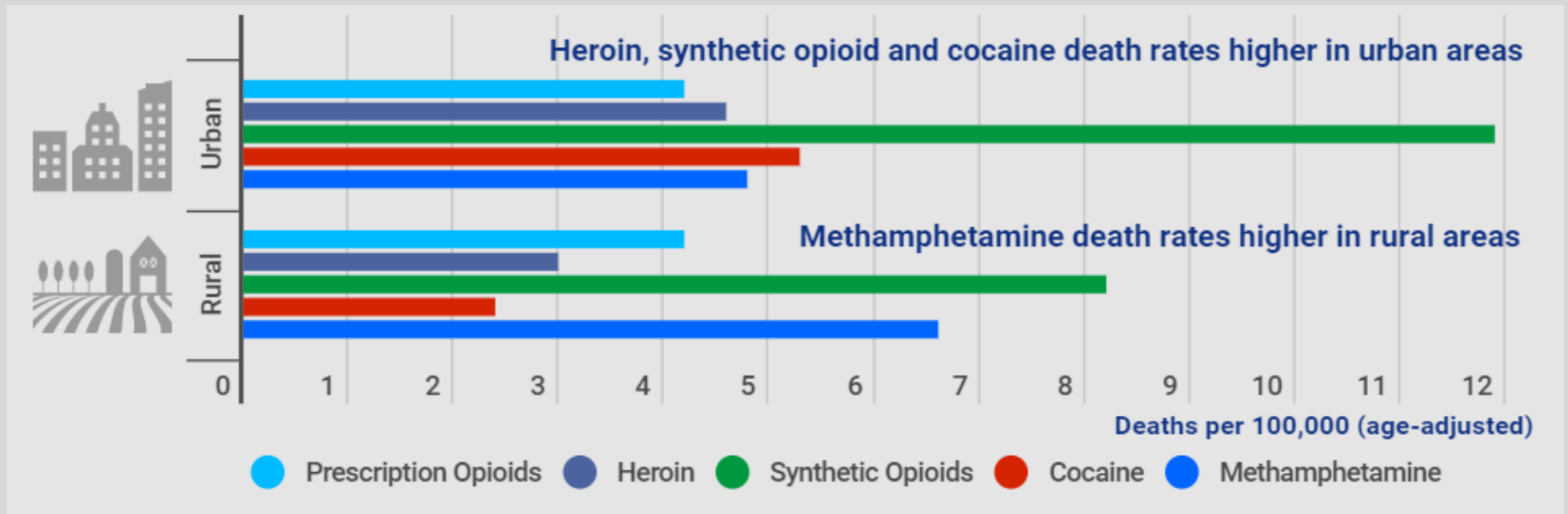
The Multiple Cause of Death data are produced by the Division of Vital Statistics, National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention (CDC), United States Department of Health and Human Services (US DHHS).

Results

Overdose Deaths by Fentanyl and Stimulant Presence, 2010-2021



Differential Drug-Related Death Rates in Rural vs. Urban Areas



The Pacific Islands become collateral damage on the drug superhighway

JOSE SOUSA-SANTOS

Australia and New Zealand must address the fallout from an appetite for illicit drugs. The Pacific is relying on it.



Demand for drugs such as methamphetamine (ice) is a driver of transnational crime in the Pacific (Radspunk/Creative Commons)

<https://www.lowyinstitute.org/the-interpretor/pacific-islands-become-collateral-damage-drug-superhighway>

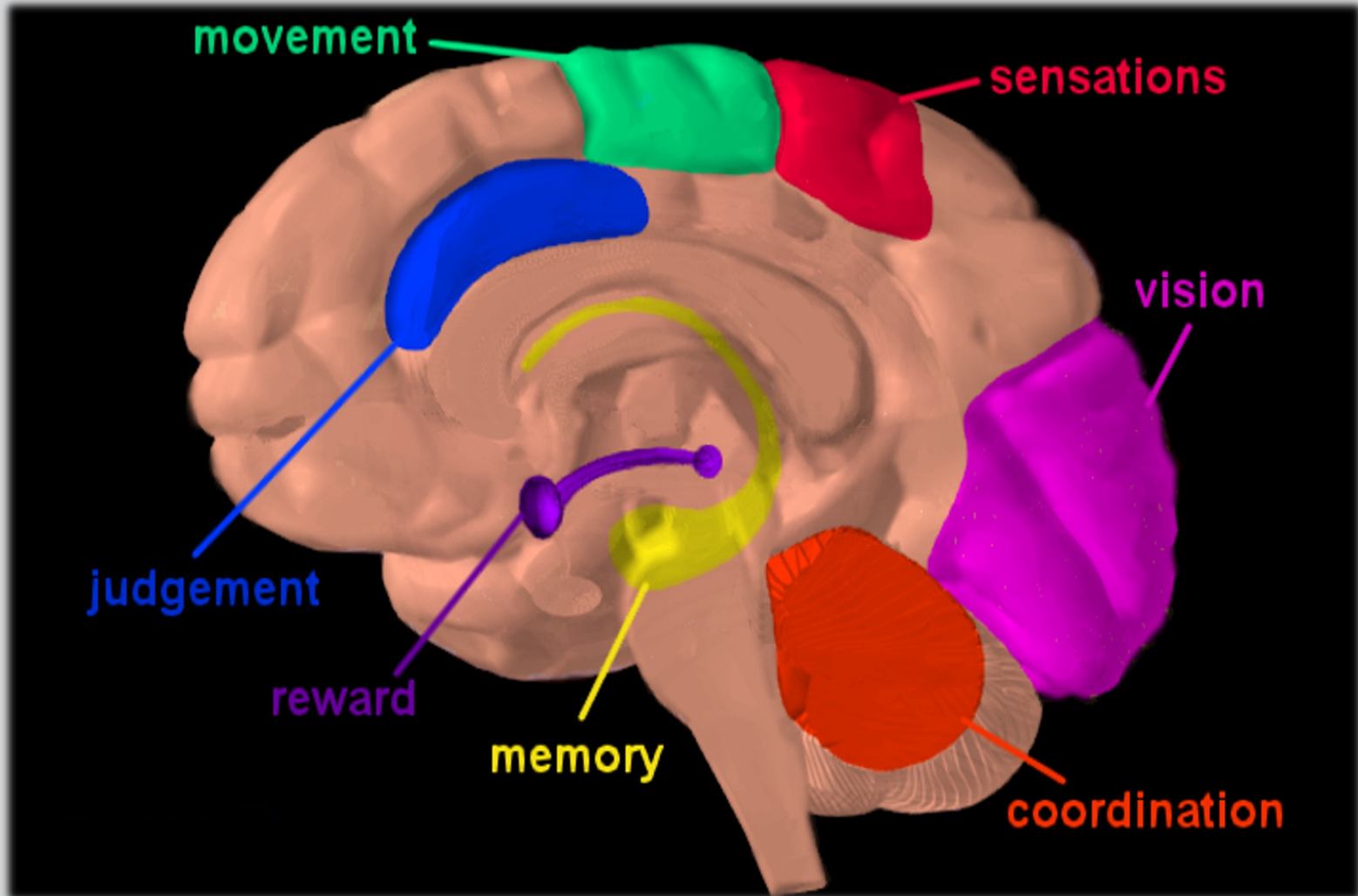
The Impact of Stimulants on the Brain and Body



ATTC

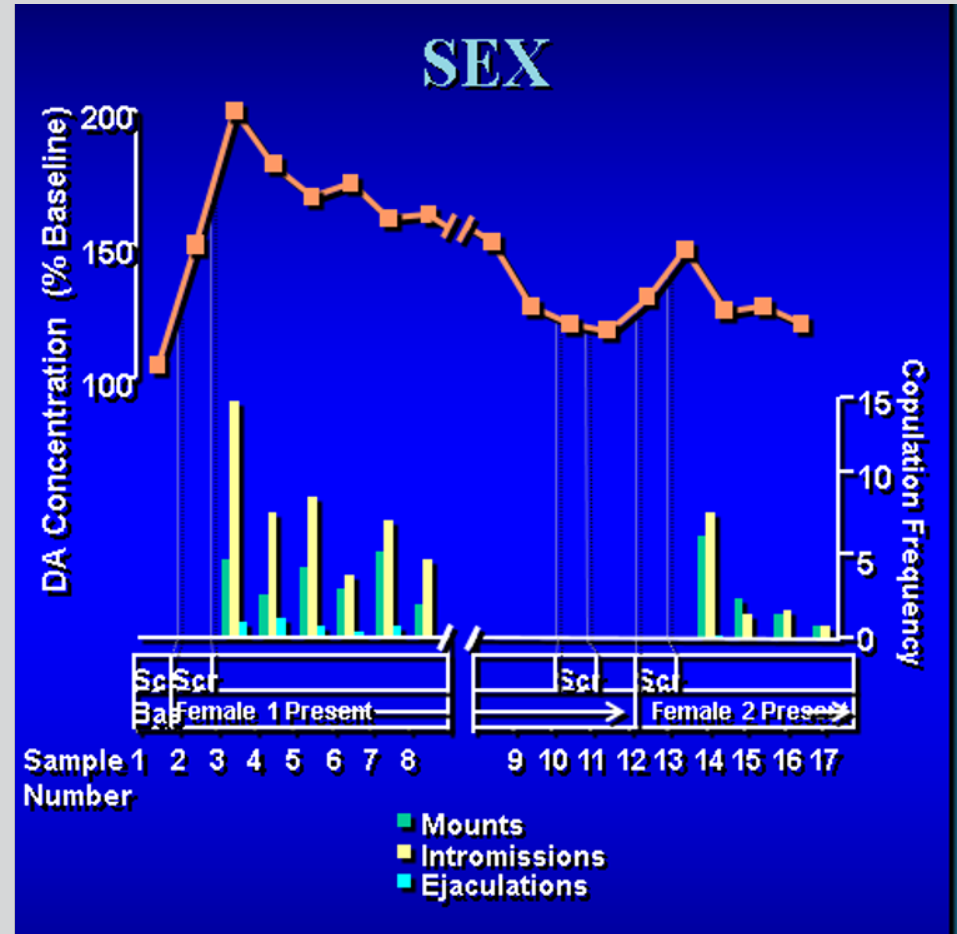
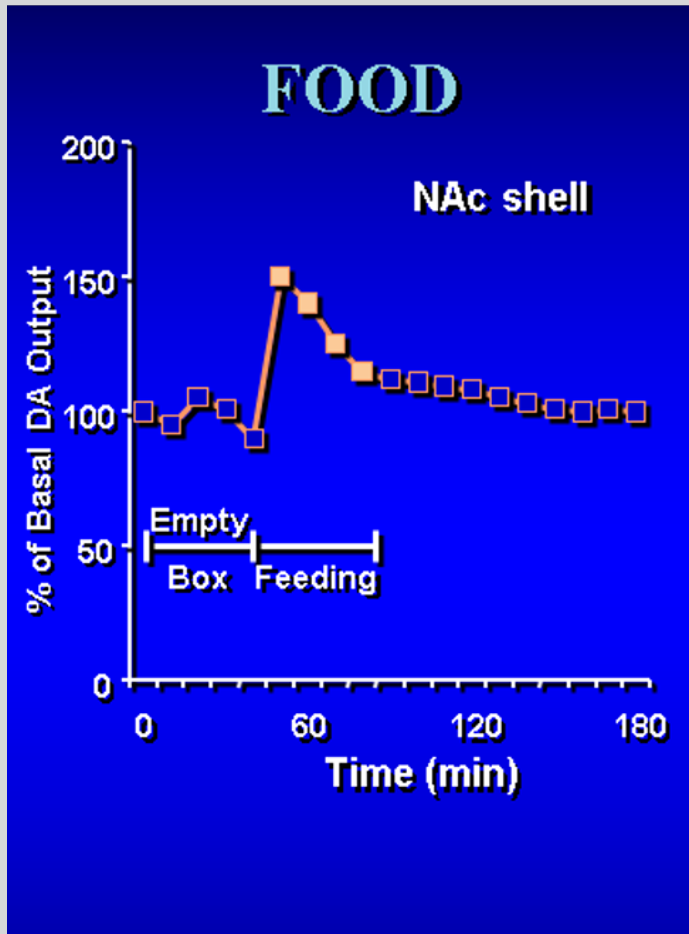
SAMHSA
Substance Abuse and Mental Health
Services Administration

Brain Areas Affected by Psychoactive Substances



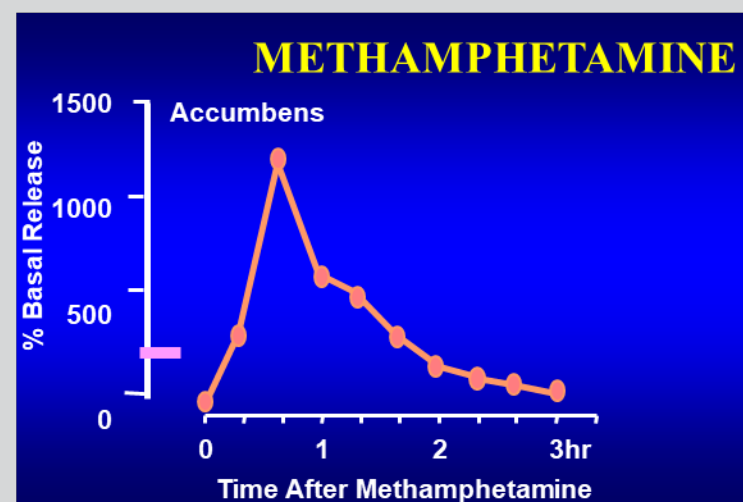
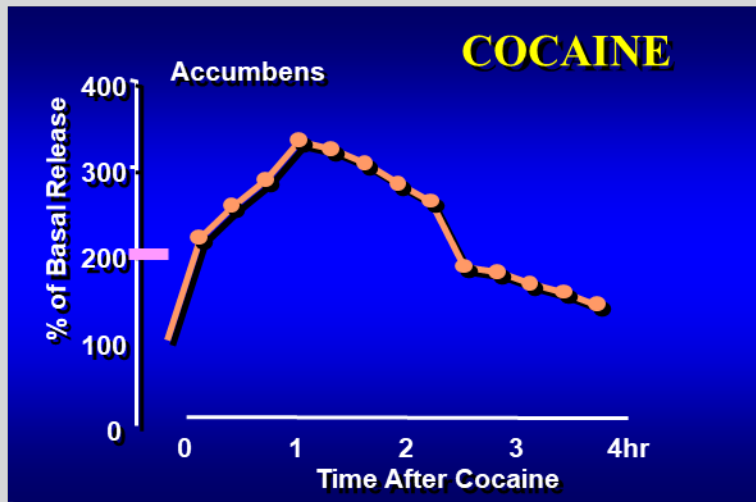
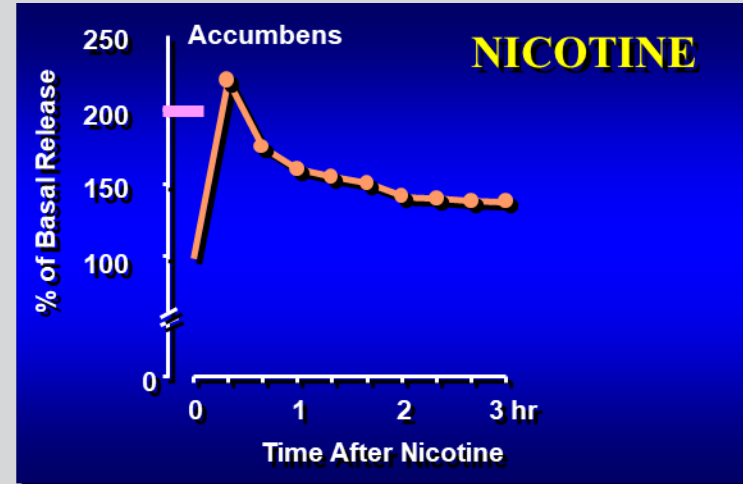
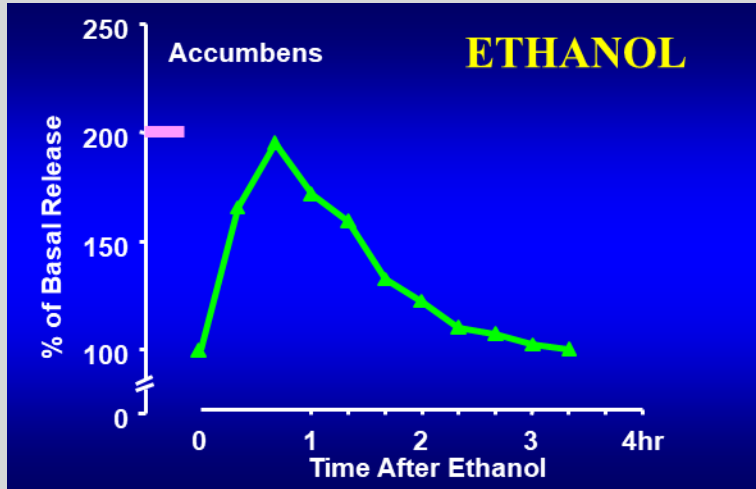
SOURCE: NIDA, 2019

Natural Rewards Elevate Dopamine Levels



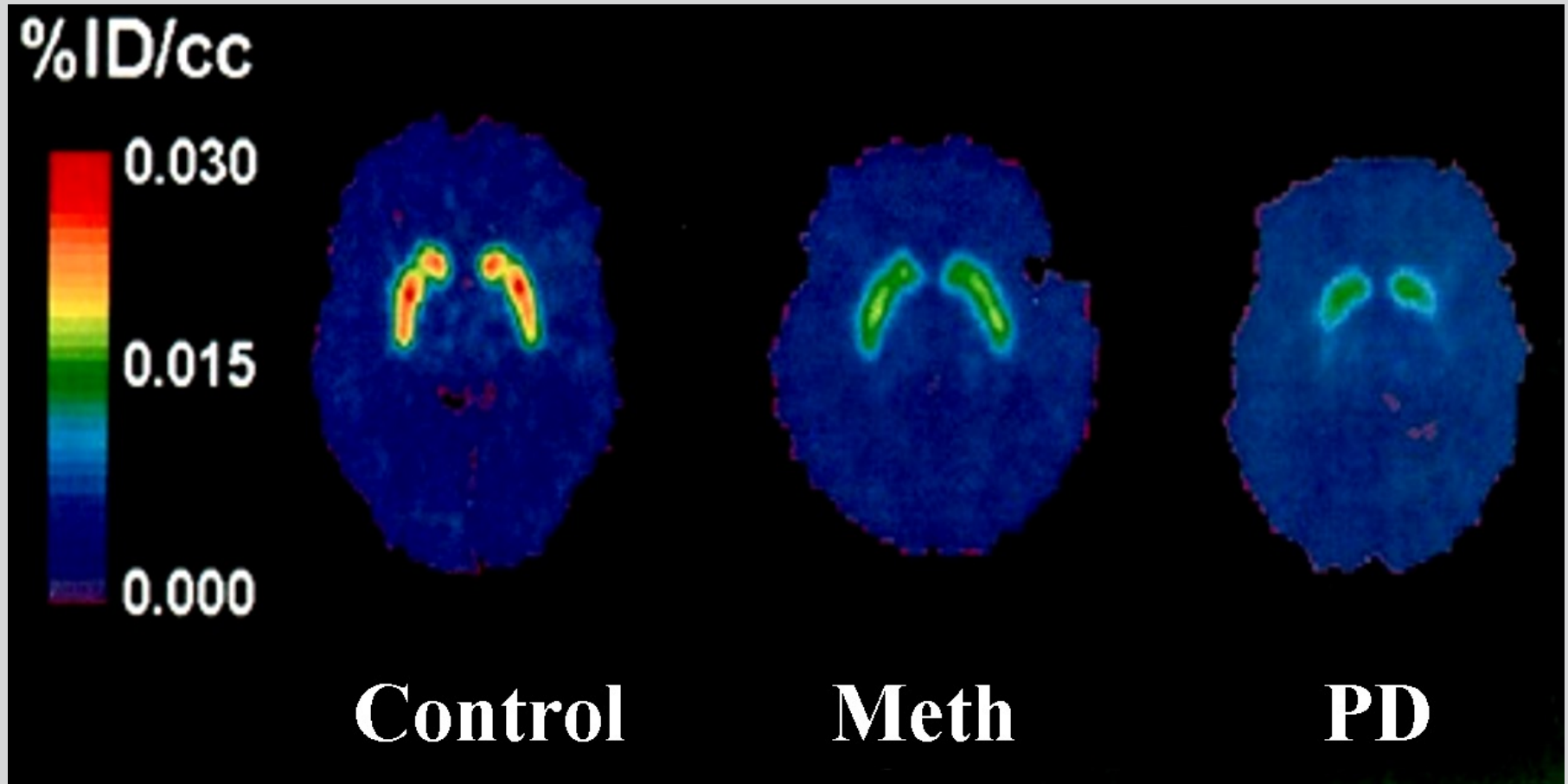
SOURCES: Bassareo & DiChiara, 1999;
Fiorino & Phillips, 1997

Effects of Drugs on Dopamine Release



SOURCES: Shoblock et al., 2003;
DiChiara & Imperato, 1988

Decreased Dopamine Transporter Binding: Use of Meth and Parkinson's Disease



What Do Newer Research Studies Say?



- A 2011 study examined 300,000 hospital records spanning 16 years and found that patients with methamphetamine use disorders were **75% more likely** to develop Parkinson's disease.
- A 2015 study in Utah found that people who use methamphetamine were **300% more likely** to develop Parkinson's disease compared to those who did not use drugs or those who used cocaine.
 - Study also found that risk may be higher for females.
- A 2018 study concluded that methamphetamine use, along with other risk factors that a person may have, **may be an initiating event** in the development of Parkinson's Disease.



Acute and Chronic Effects of Stimulants

Acute Physical Effects of Stimulants



Increases

- Heart rate
- Blood pressure
- Pupil size
- Respiration
- Sensory acuity
- Energy

Decreases

- Appetite
- Sleep
- Reaction Time

Acute Psychological Effects of Stimulants



Increases

- Confidence
- Alertness
- Mood/Euphoria
- Sex drive
- Energy
- Talkativeness

Decreases

- Boredom
- Loneliness
- Timidity

Chronic Effects of Stimulants



Physical

- Tremor
- Weakness
- Dry mouth
- Weight loss
- Cough
- Sinus infection
- Dental Problems
- Sweating
- Burned lips; sore nose
- Oily skin/complexion
- Headaches
- Diarrhea
- Anorexia
- Overheating

Psychological

- Confusion
- Concentration
- Hallucinations
- Fatigue
- Memory loss
- Insomnia
- Irritability
- Paranoia
- Panic reactions
- Depression
- Anger
- Psychosis

Chronic Stimulant Use (2)

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)

Did I Mention Skin Problems?



- Grayish leathery texture to skin
- Increased sweating (hyperhidrosis)
- Repetitive or compulsive skin picking
 - “Speed bumps” / Formication

Use of Methamphetamine Leads to Severe Tooth Decay



- Methamphetamine-related dental issues are characterized by severe tooth decay and gum disease
- Teeth often break or fall out

Effects of Stimulant Use During Pregnancy



- Maternal migraines and seizures
- Premature membrane rupture
- Separation of placental lining from uterus prior to delivery
- High blood pressure
- Edema and seizures
- Spontaneous miscarriage
- Preterm labor
- Difficult delivery

Additional Effects of Methamphetamine



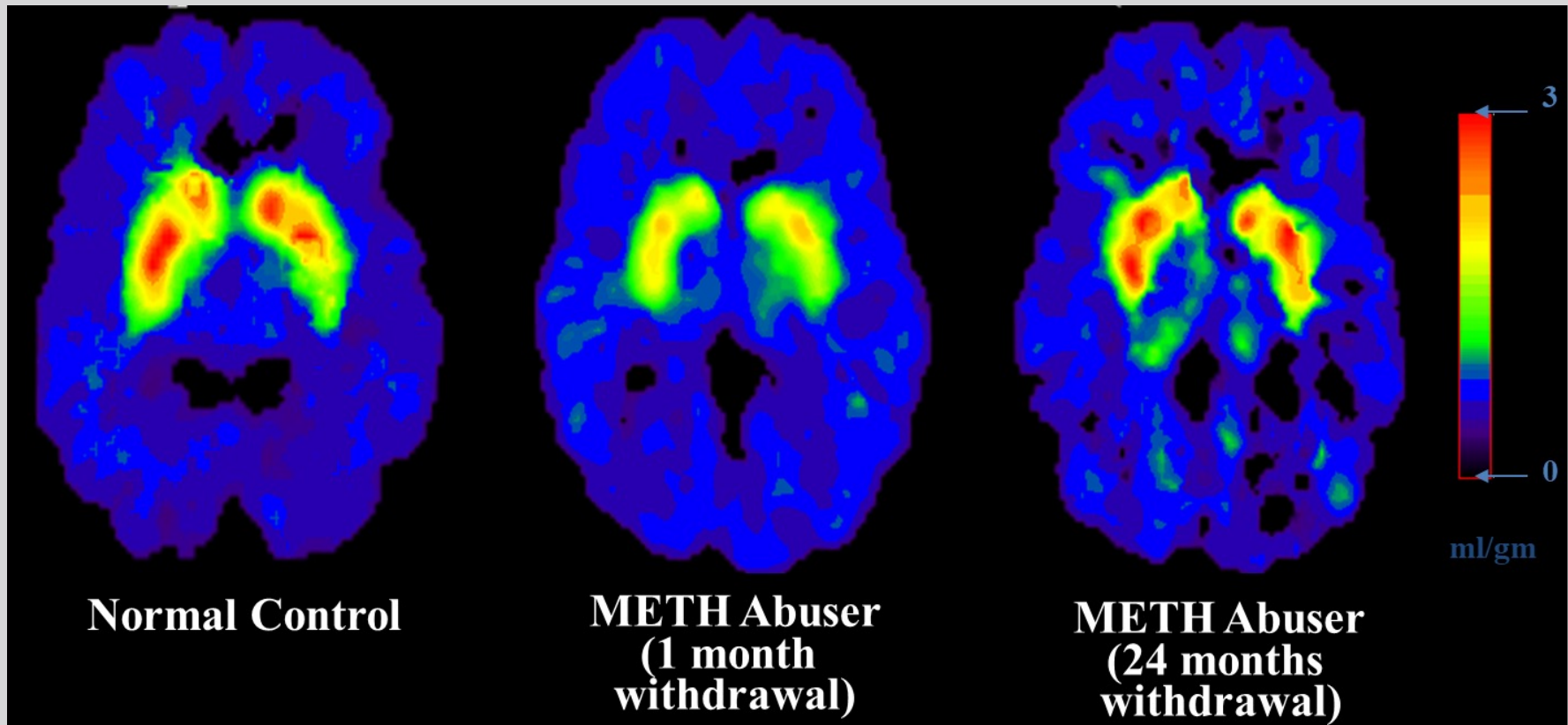
- Cardiac and brain abnormalities
- Neurological problems
 - Decreased arousal
 - Increased stress
 - Attention impairments

Methamphetamine Use and Violence

- Compared to no use, amphetamines use was associated with a **2-fold increase** in the odds of **hostility or violence**
- Frequent use **increases the risk of violent behavior**
- Other risk factors included: psychotic symptoms, alcohol or other drug use, psychosocial problems, and impulsivity
- People who use methamphetamine are also more likely to be **victims of abuse or violent acts**
- **Women** who used methamphetamine are **significantly more likely to experience** partner abuse/violence



Partial Recovery of Brain Dopamine Transporters Following Protracted Abstinence



Behavioral Treatments



- Contingency Management
- Community Reinforcement Approach
- Cognitive Behavioral Therapy/Relapse Prevention
- Motivational Interviewing
- Matrix Model
- Exercise
- Mindfulness

More (Recent) Evidence for Contingency Management as a Response to Stimulant Use (1)

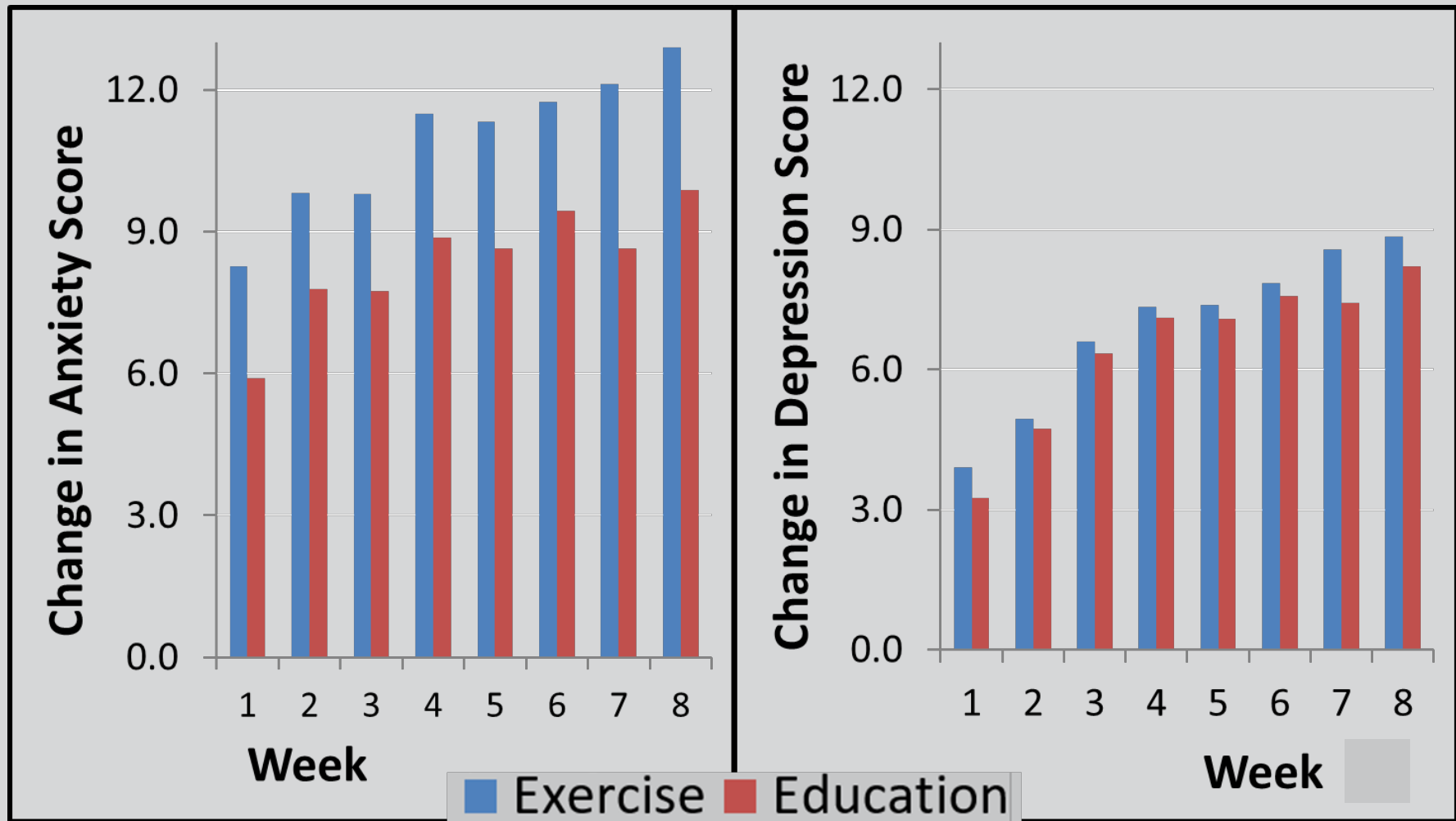
- A 2020 systemic review of 27 studies found that contingency management has broad benefits in:
 - Greater drug adherence
 - Higher utilization of other treatments and medical services
 - Reductions in risky sexual behavior
- Recommendation: Outpatient programs that offer treatment to people with a methamphetamine use disorder should **prioritize adoption and implementation of contingency management**

Responding to Global Stimulant Use: Challenges and Opportunities



- Psychosocial interventions other than contingency management have weak and non-specific effects on stimulant problems
- No effective pharmacotherapies have been approved
- Substantial research investment is needed to develop more effective, innovative, and impactful prevention and treatment

The Impact of Exercise on Depression and Anxiety Symptoms



SOURCE: Rawson et al., 2015

Strategies for Cognitive Impairments

MODIFY TREATMENT PROTOCOLS

- **Decrease** length of sessions (attention, memory)
- Take **structured breaks** (attention, focus, memory)
- **Increase** session frequency (practice)
- **Repeat** presentations of therapeutic information (detox, 2 weeks, 4 weeks, 1 month, 3 months, etc.)
- **Multi-modal presentations**—audio, visual, experiential, verbal, hot/cold situations, etc.

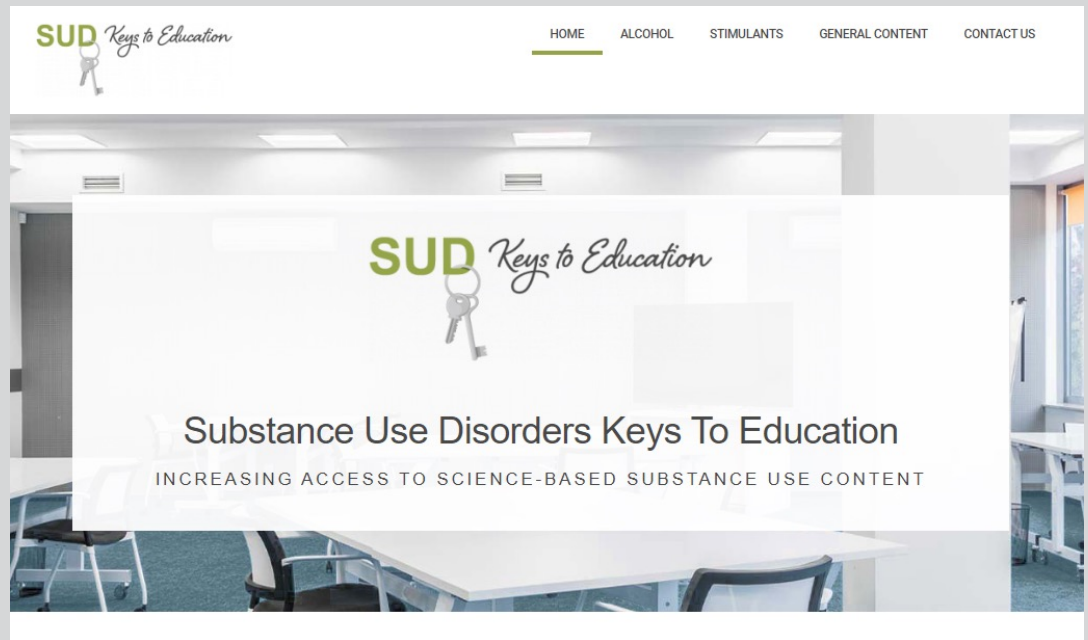
Strategies for Cognitive Impairments

MODIFY TREATMENT PROTOCOLS

- Use **memory aids**— calendars, planners, phone apps, diagrams
- Teach **stress management, breathing, relaxation, and mindfulness meditation** skills
- Provide **immediate feedback** and corrective experiences
- Repeat instructions, **put things in writing**, provide short/direct instructions

**A new approach
to curriculum
infusion...**

**For educators
and clinical
supervisors**





**Welcome to the Pacific Southwest
Addiction Technology Transfer Center
Online Learning Center**

*We are constantly adding new courses and content.
Check back frequently for new courses & opportunities.*



Full course catalog available at:

<https://docs.google.com/document/d/10r78aNpgPzIdc2TGM5bH29ODaA8xtAPHsK8vDuticLQ/edit?usp=sharing>

Resources for Continued Learning



- ATTC Network's *Focus on Stimulant Misuse* Web Page:
<https://attcnetwork.org/centers/global-attc/focus-stimulant-misuse>
- *Evidence-Based Resource Guide Series: Treatment of Stimulant Use Disorders*:
<https://store.samhsa.gov/product/Treatment-of-Stimulant-Use-Disorder/PEP20-06-01-001>
- Northwest ATTC's *Contingency Management for Healthcare Settings Self-Paced Online Course*:
<https://healthknowledge.org/course/search.php?search=Contingency+Management>
- *Treatment for Stimulant Use Disorders (TIP 33 Update)*:
https://store.samhsa.gov/sites/default/files/SAMHSA_Digital_Download/PEP21-02-01-004.pdf

Thank You For Your Time



- The various components of the ATTC Stimulant 101 curriculum are posted at: <https://attcnetwork.org/centers/global-attc/focus-stimulant-misuse>
- For additional information regarding SUD treatment-related Training/TA, please visit: <http://www.attcnetwork.org>
- For additional information regarding HIV/AIDS-related Training/TA, please visit: <https://aidsetc.org/>