

AZ JUDICIAL CONFERENCE

*The Science Behind
the Sentence: The
Addiction,
Adolescent Brain
Development and
Youth Justice*



A person is sitting cross-legged on the floor of a prison cell. The cell is dimly lit, with a single light bulb hanging from the ceiling, casting a soft glow. The walls are made of stone, and the cell is enclosed by metal bars. The overall atmosphere is somber and reflective.

The Science

Behind the Sentence

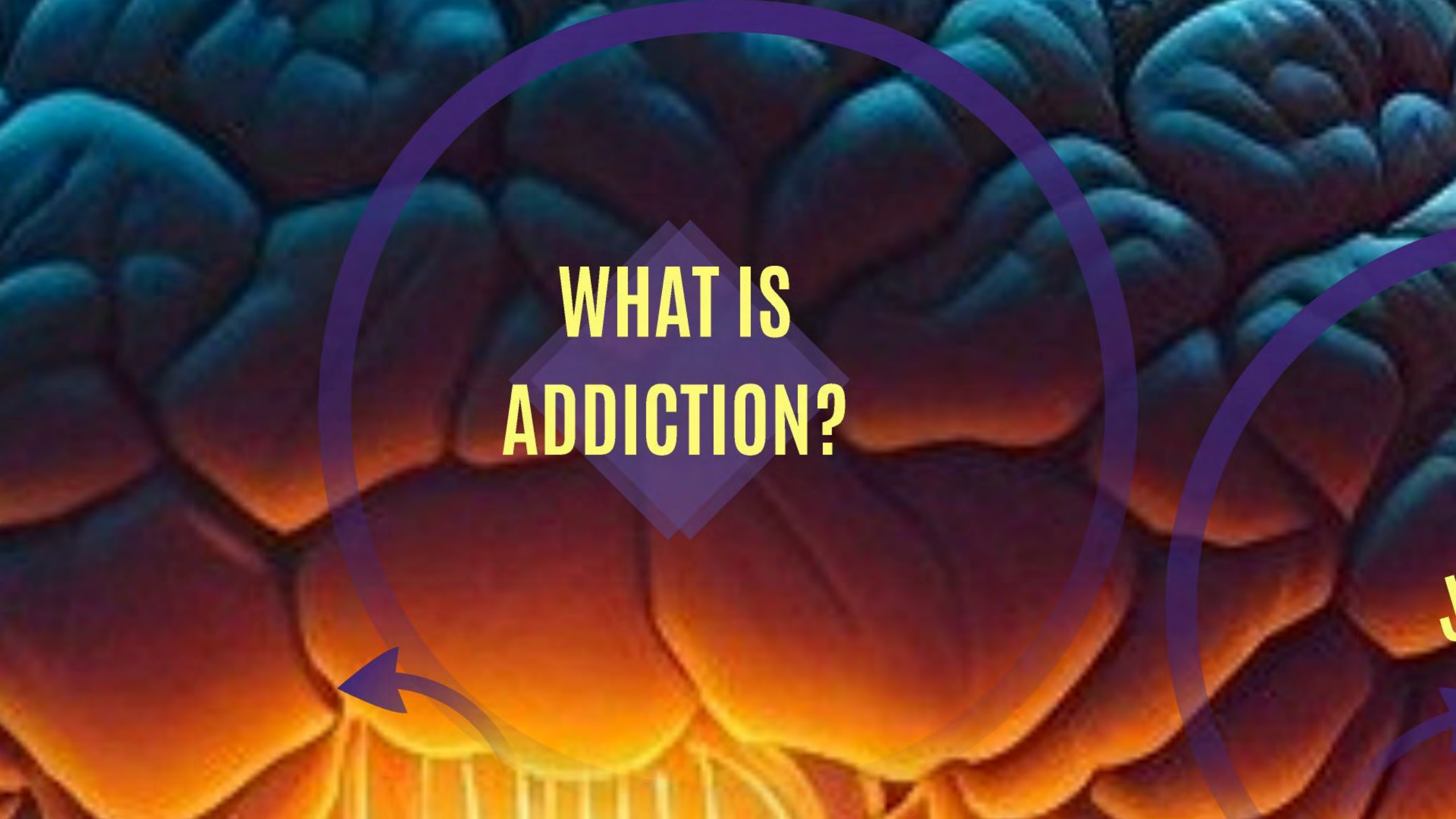
Holly Geyer, MD, FASAM

Michael Dekker, DO, FASAM

DISCLOSURES

Holly Geyer: Southwest Node of the NIDA Clinical Trials Network

Michael Dekker: No Disclosures

The image features a close-up, artistic rendering of a human brain, showing the intricate folds and grooves of the cerebral cortex. The color palette is a gradient from deep blue at the top to bright yellow and orange at the bottom. A large, semi-transparent purple circle is centered over the brain. Inside this circle, a purple diamond shape contains the text "WHAT IS ADDICTION?". A purple arrow points from the bottom of the circle towards the text. Another purple arrow is visible on the right side of the image, pointing towards the right edge.

WHAT IS ADDICTION?

What IS THIS?



PSYCHOLOGICAL

SOCIAL

SPIRITUAL

PHYSICAL

Let's Learn How to Diagnose!

PUT ON YOUR



Mrs. Johnson



ANSWERS:

Mrs. Johnson



ANSWERS:

1. High dose cisplatin

Mrs. Johnson



ANSWERS:

1. High dose cisplatin
2. Abdominal Radiation

Mrs. Johnson



ANSWERS:

1. High dose cisplatin
2. Abdominal Radiation
3. Bowel resection

Mrs. Johnson



ANSWERS:

1. High dose cisplatin
2. Abdominal Radiation
3. Bowel resection
4. **HOLY MOLY Lady, are you CRAZY!!! you DON'T HAVE A DIAGNOSIS!!**

Mrs. Johnson



JOHNNY



JOHNNY

Bad Attitude
Late for School
Not sleeping
Aggitated
Withdrawn
Shaky at the Dinner Table
Drug Paraphanalia in Drawer



What do we order?



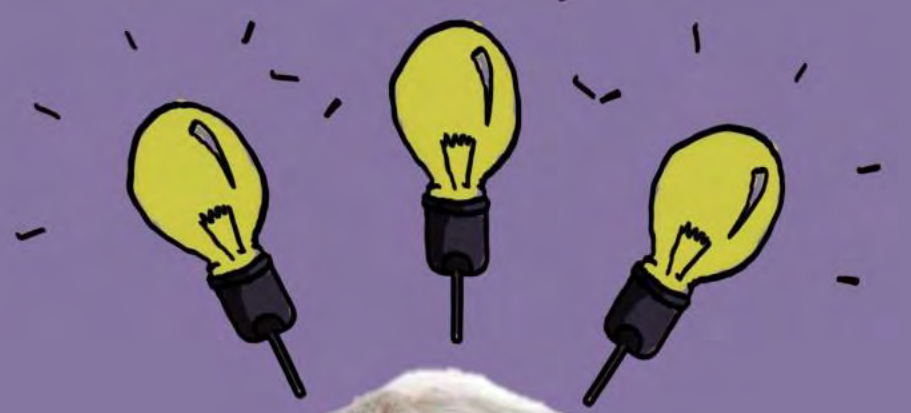
What do we order?

1. Labs



What do we order?

~~1. Labs~~



What do we order?

~~1. Labs~~

2. Brain Biopsy



What do we order?

~~1. Labs~~

~~2. Drain Biopsy~~



What do we order?

~~1. Labs~~

~~2. Drain Biopsy~~

3. MRI or CT Head

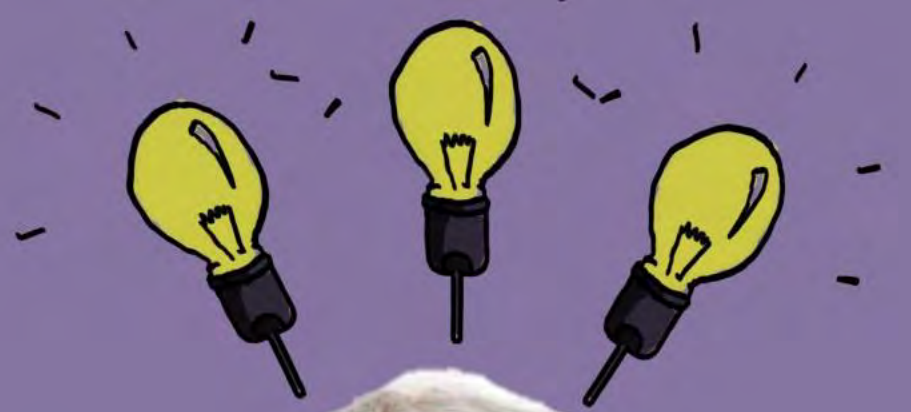


What do we order?

~~1. Labs~~

~~2. Drain Biopsy~~

~~3. MRI or CT Head~~



What do we order?

~~1. Labs~~

~~2. Drain Biopsy~~

~~3. MRI or CT Head~~

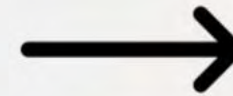
4. Lunch?





Back in the Day

Addictive Behaviors
Overdoses
Withdrawals
High Tolerance



RECOMMEND THEY
FIND A
**BEHAVIORAL
HEALTH
TREATMENT
PROGRAM**

Medical Field

- EVIDENCE-BASED
- OBJECTIVE FEATURES
- DIAGNOSTICS DEPENDENT
- REPRODUCIBLE
- STANDARDIZED

Behavioral Health Field

- +/- EVIDENCE-BASED
- SUBJECTIVE FEATURES
- LIMITED DIAGNOSTICS
- +/- REPRODUCIBLE
- +/- STANDARDIZED

The image features a large purple circle and a purple diamond shape overlaid on a background. The background consists of a globe on the left and a map of the United States on the right. The text "WHEN THAT ALL CHANGED" is centered in the purple diamond shape.

**WHEN THAT
ALL CHANGED**



ENTER:
the

OPIOID EPIDEMIC



Addiction Is



Addiction Is

A DISEASE



Let's Talk Brain



INHIBITORY CON

ACG
PFC

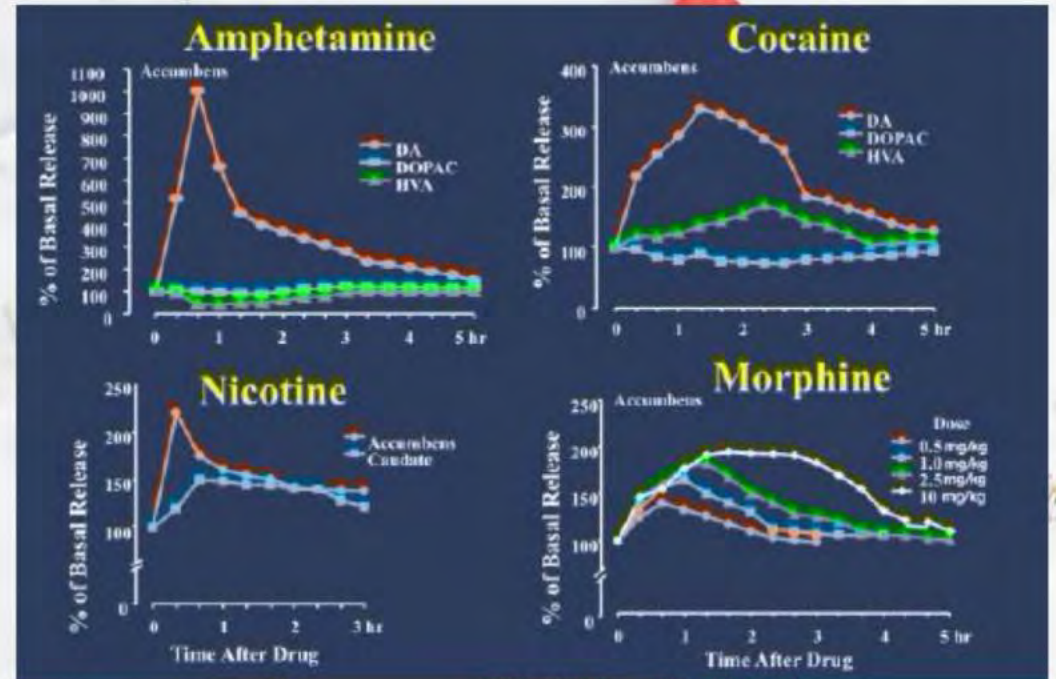
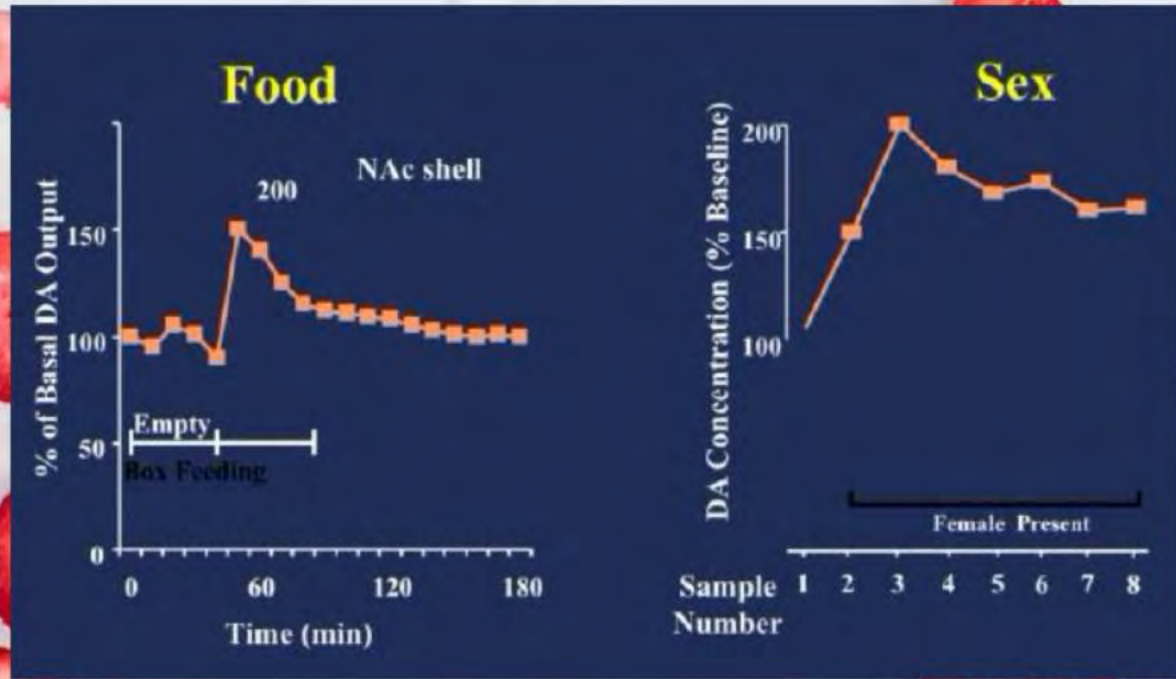
MOTIVATION/DE

OFC
SCC

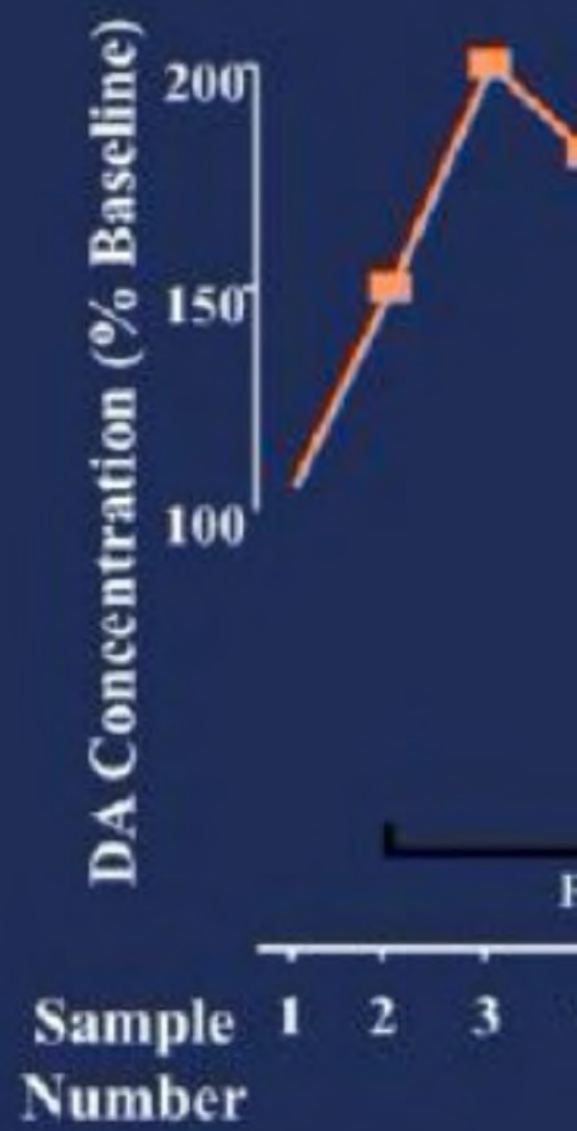
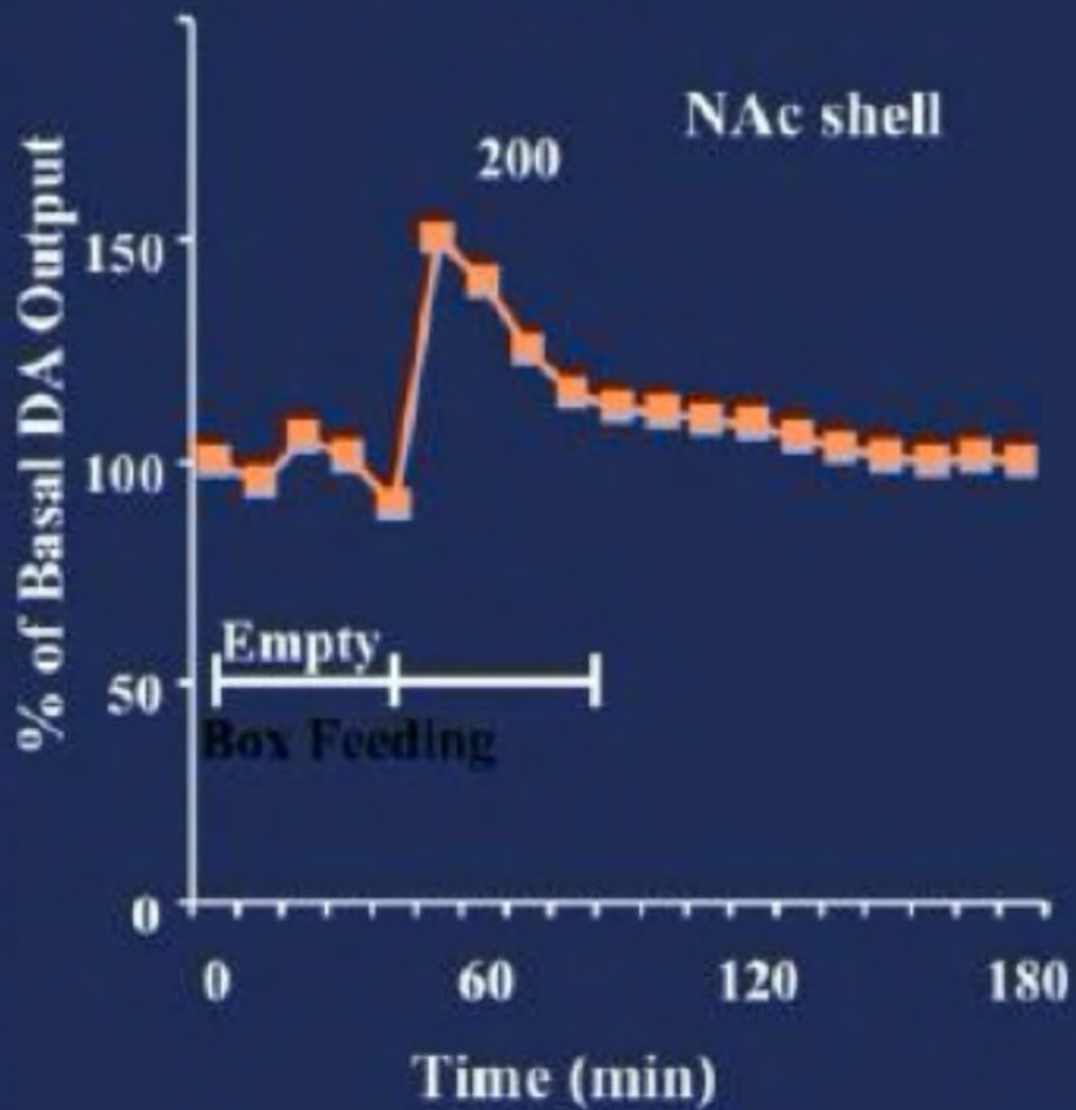
A 3D anatomical illustration of a human head in profile, facing left. The brain is rendered in a reddish-pink color, showing the gyri and sulci of the cerebral cortex. The facial features, including the nose, lips, and ears, are rendered in a realistic skin tone. The background is a solid light blue color.

Dopamine Transmission

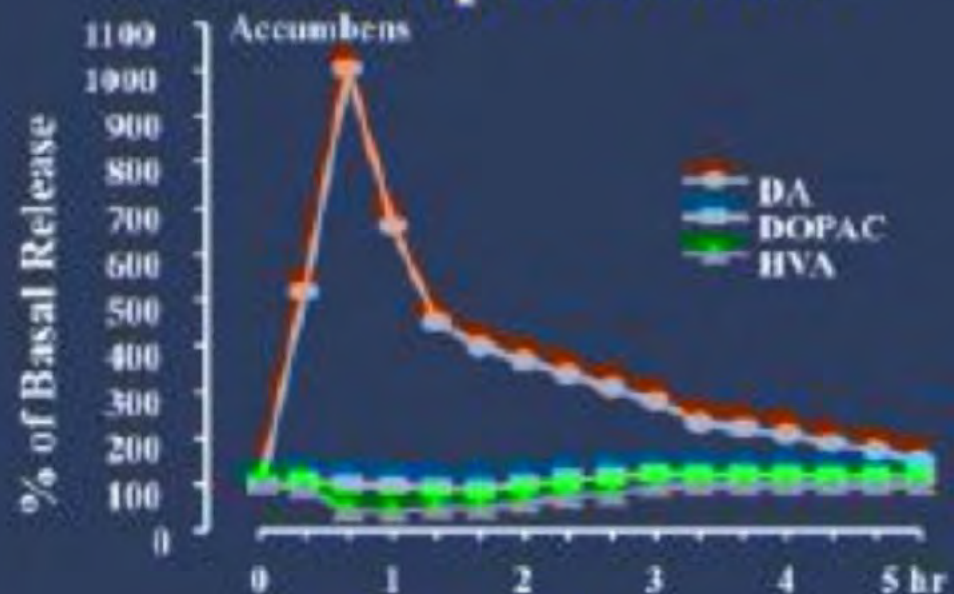
Dopamine, the 'Happy' Chemical



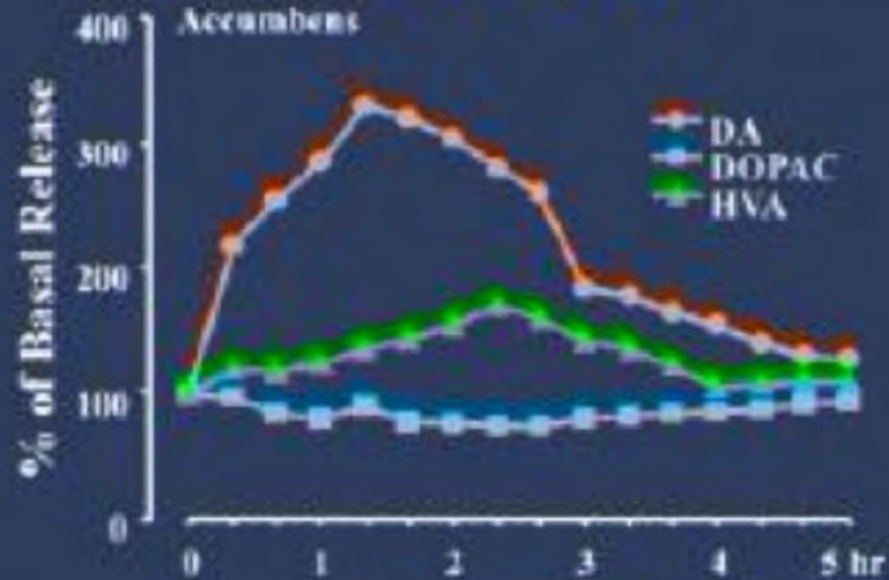
Food



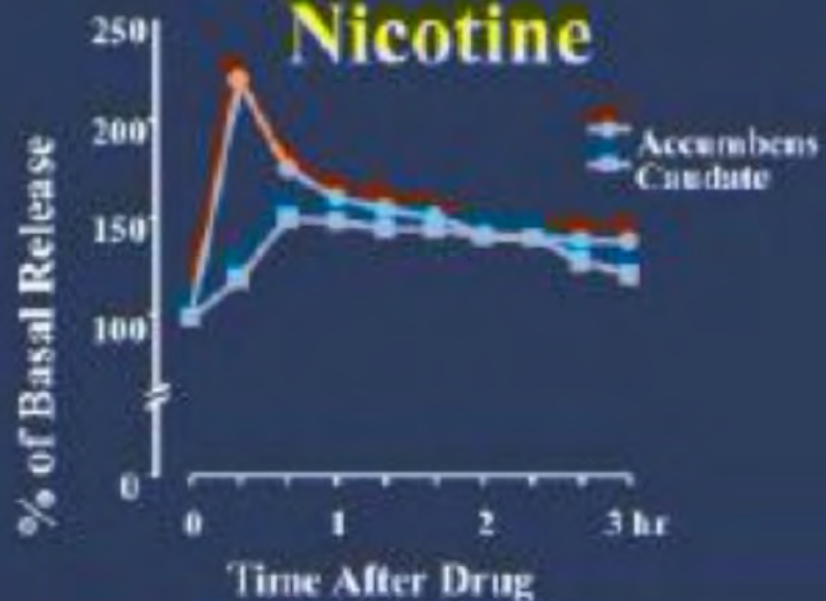
Amphetamine



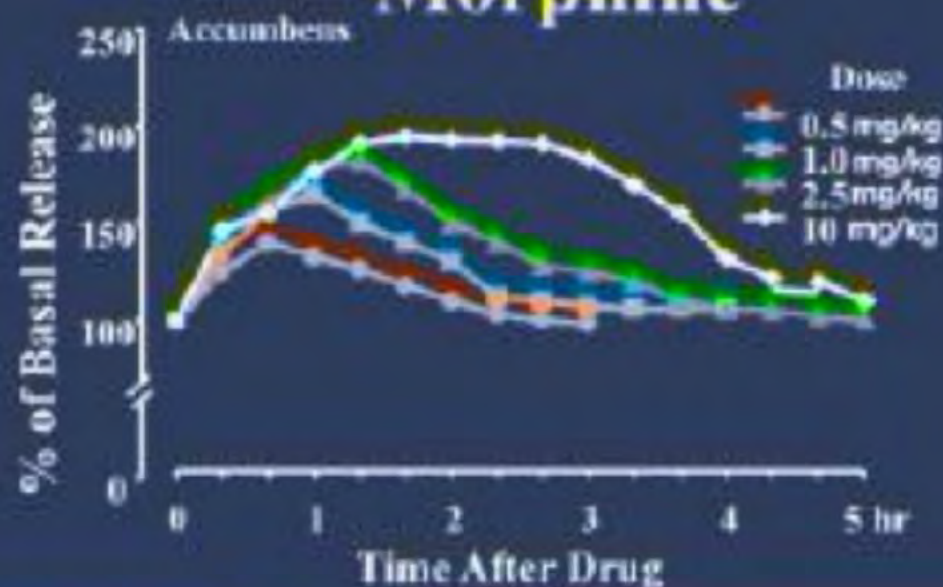
Cocaine



Nicotine



Morphine



The Brain Adapts!

OPIOIDS WARP

- REWARD PREDICTION
- STIMULUS-RESPONSE
- APPROACH BEHAVIOR
- LEARNING (CONDITIONED TOO)
- DECISION MAKING



NUCLEUS ACUMBENS DENDRITE

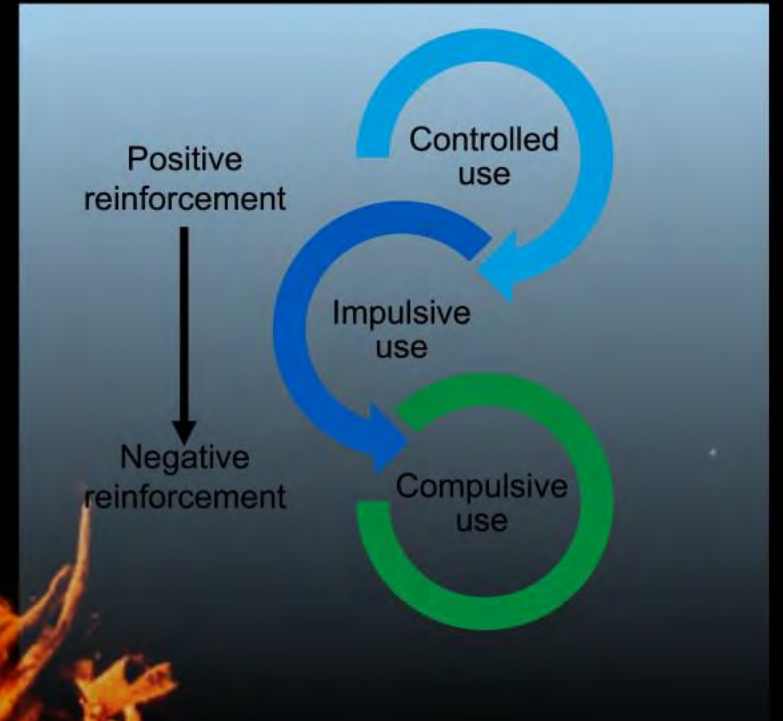
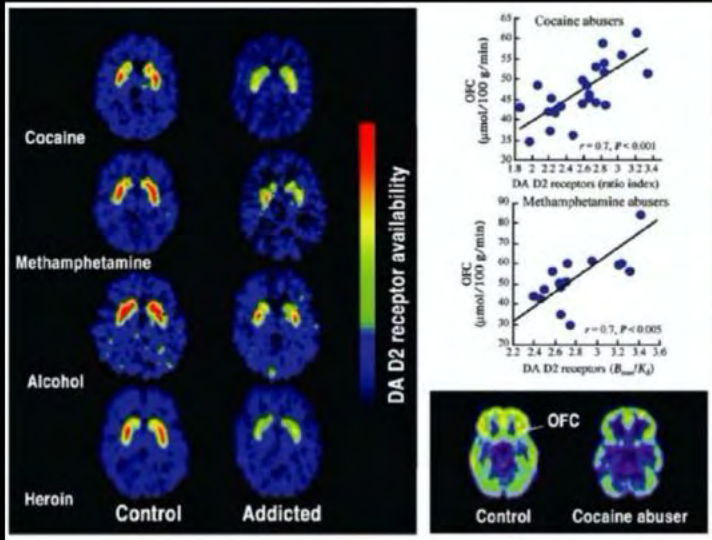
AKA: PLEASURE CENTER NERVE

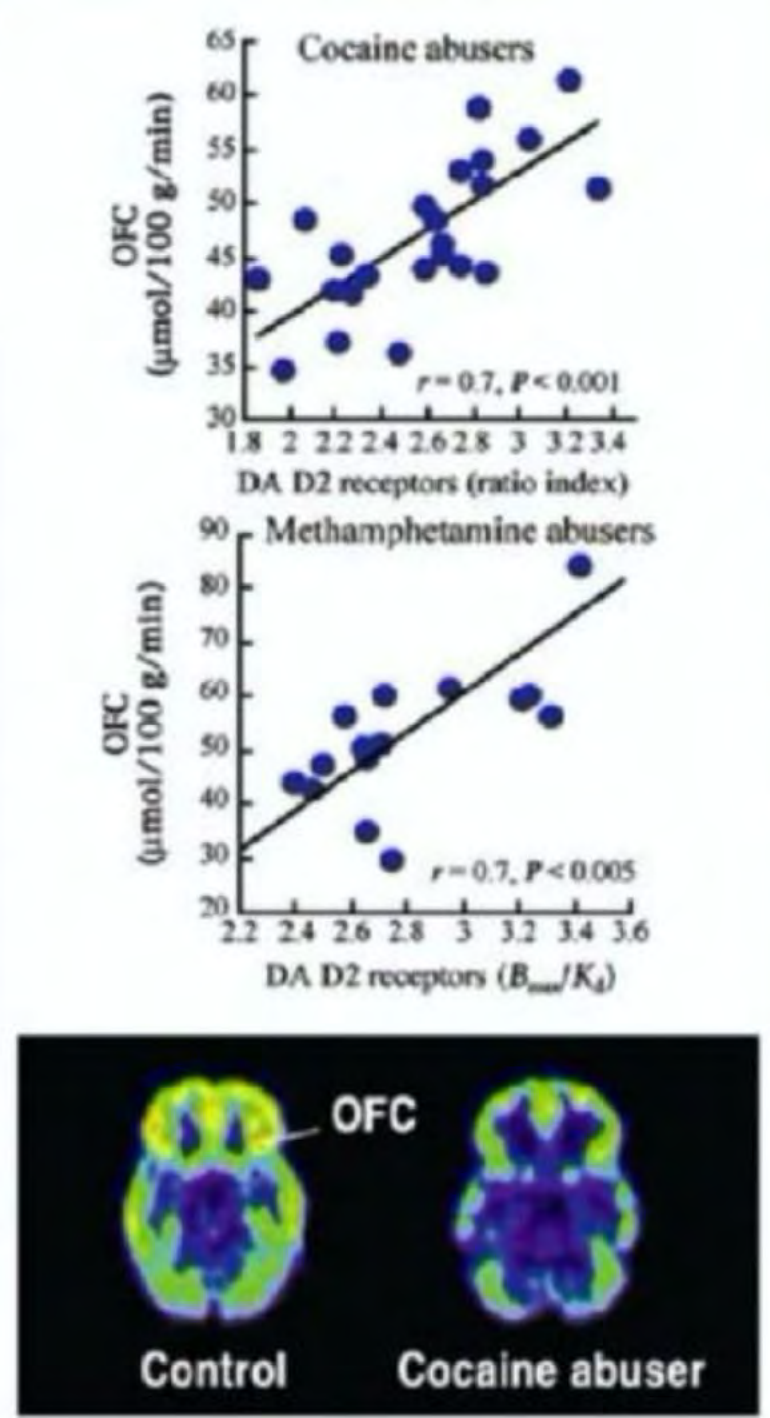


Saline

Amph

And Burns Out

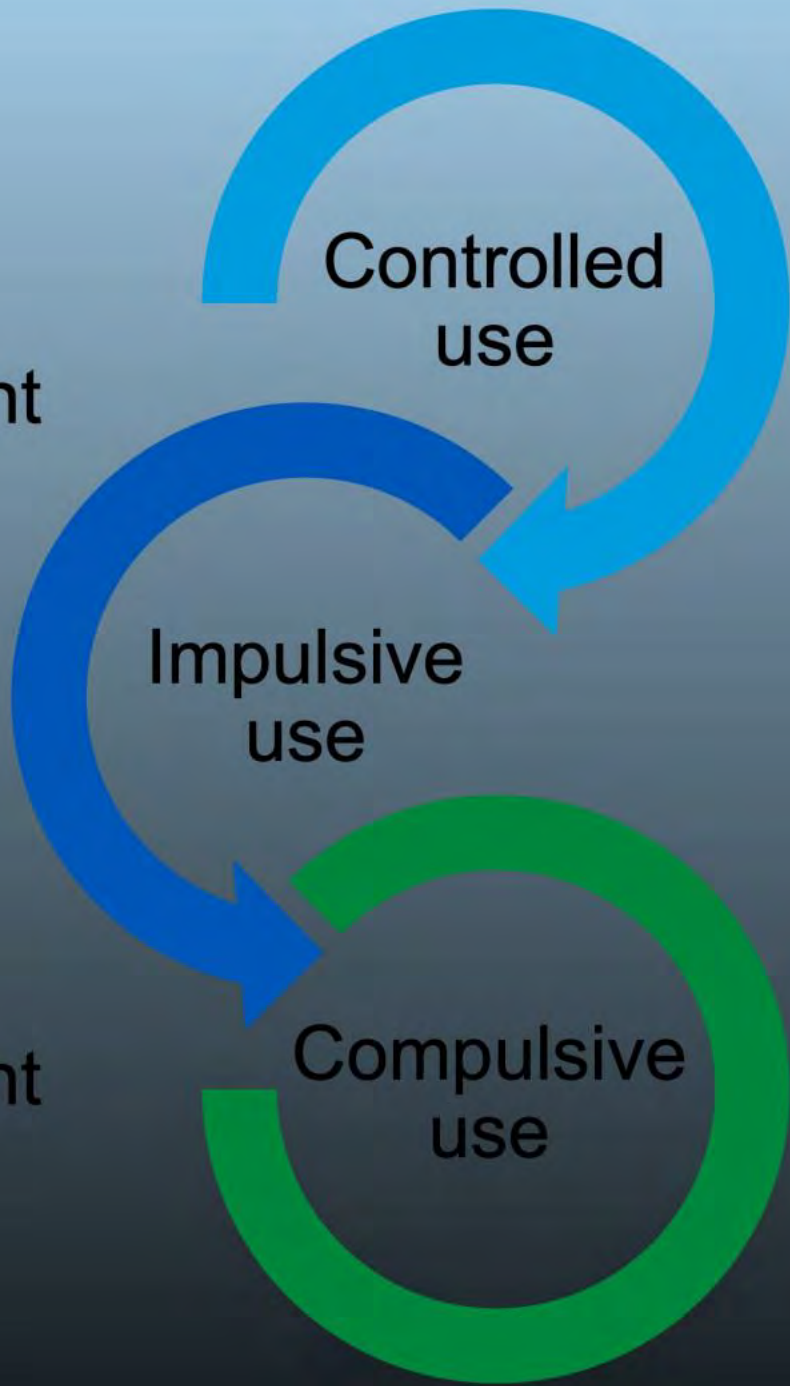




Positive reinforcement



Negative reinforcement



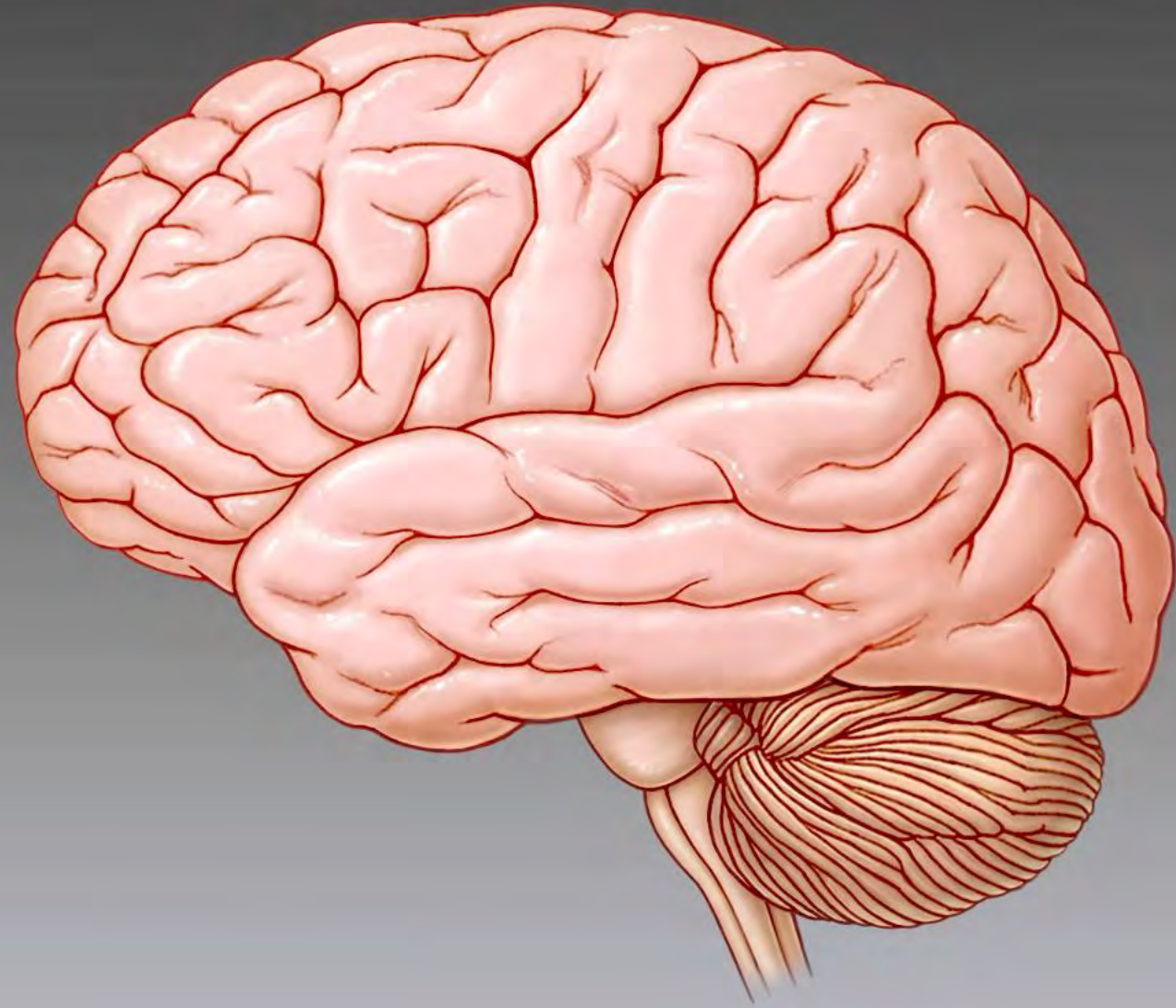
Controlled use

Impulsive use

Compulsive use

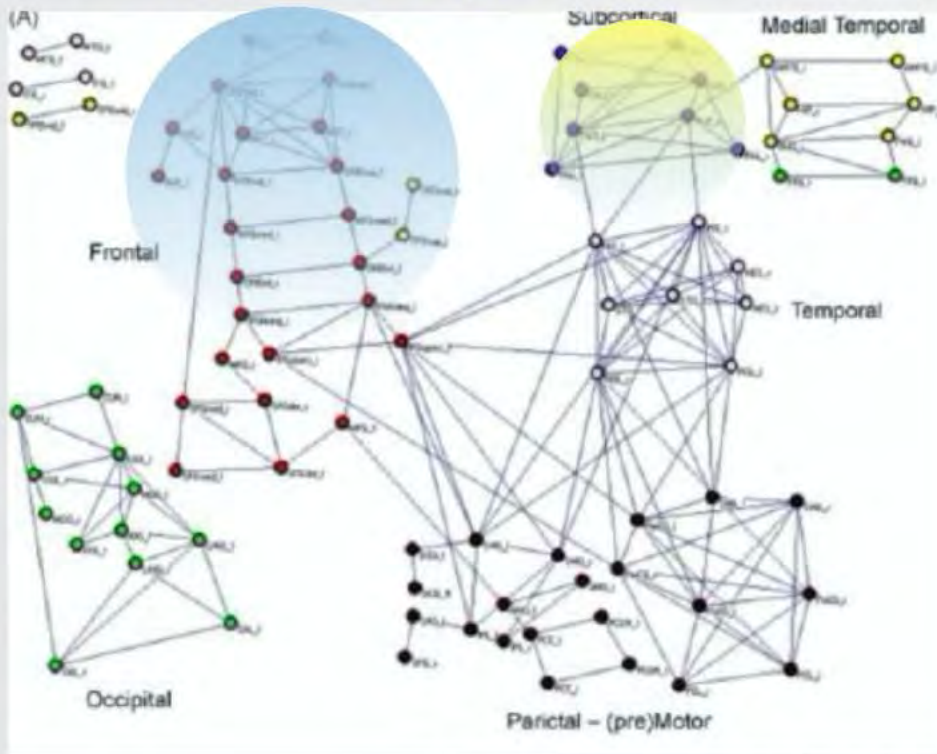
Stress Hormones (CRF) on Overdrive



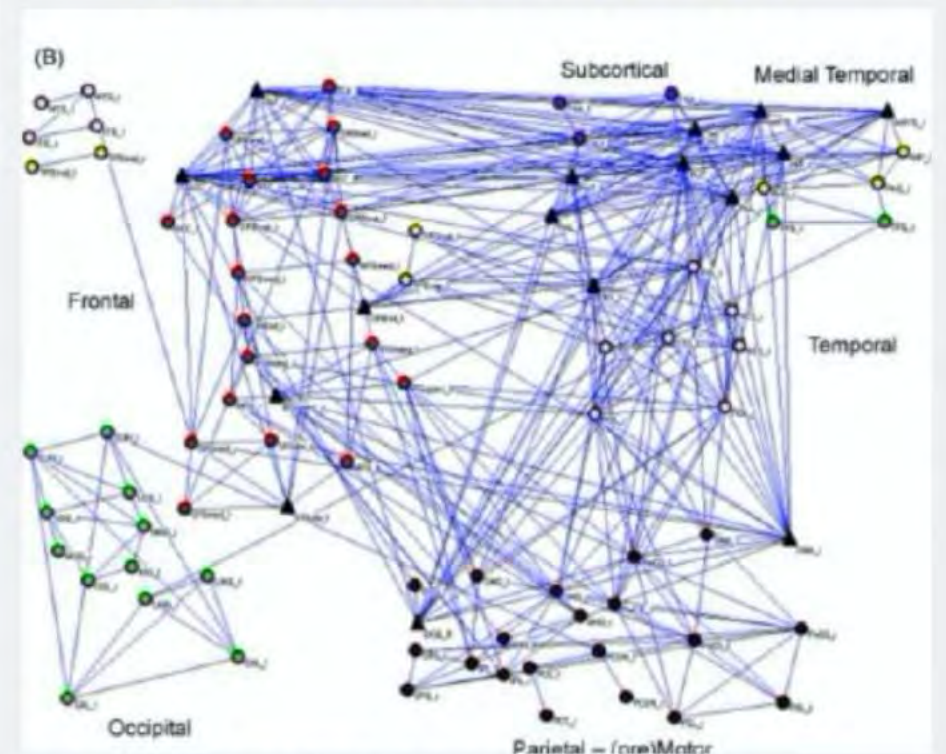


And Rewires

Non-Drug User



Chronic heroin user



Comparison of non-drug users and the chronic heroin users' brain functional networks during the resting state

The Mind Becomes a Prison

WITHDRAWALS

PAIN

LOSS OF EXECUTIVE
FUNCTION

MEMORIES

ANXIETY

DYSPHORIA

Addiction Is

A DISEASE



NO ONE
CHOOSES
ADDICTION

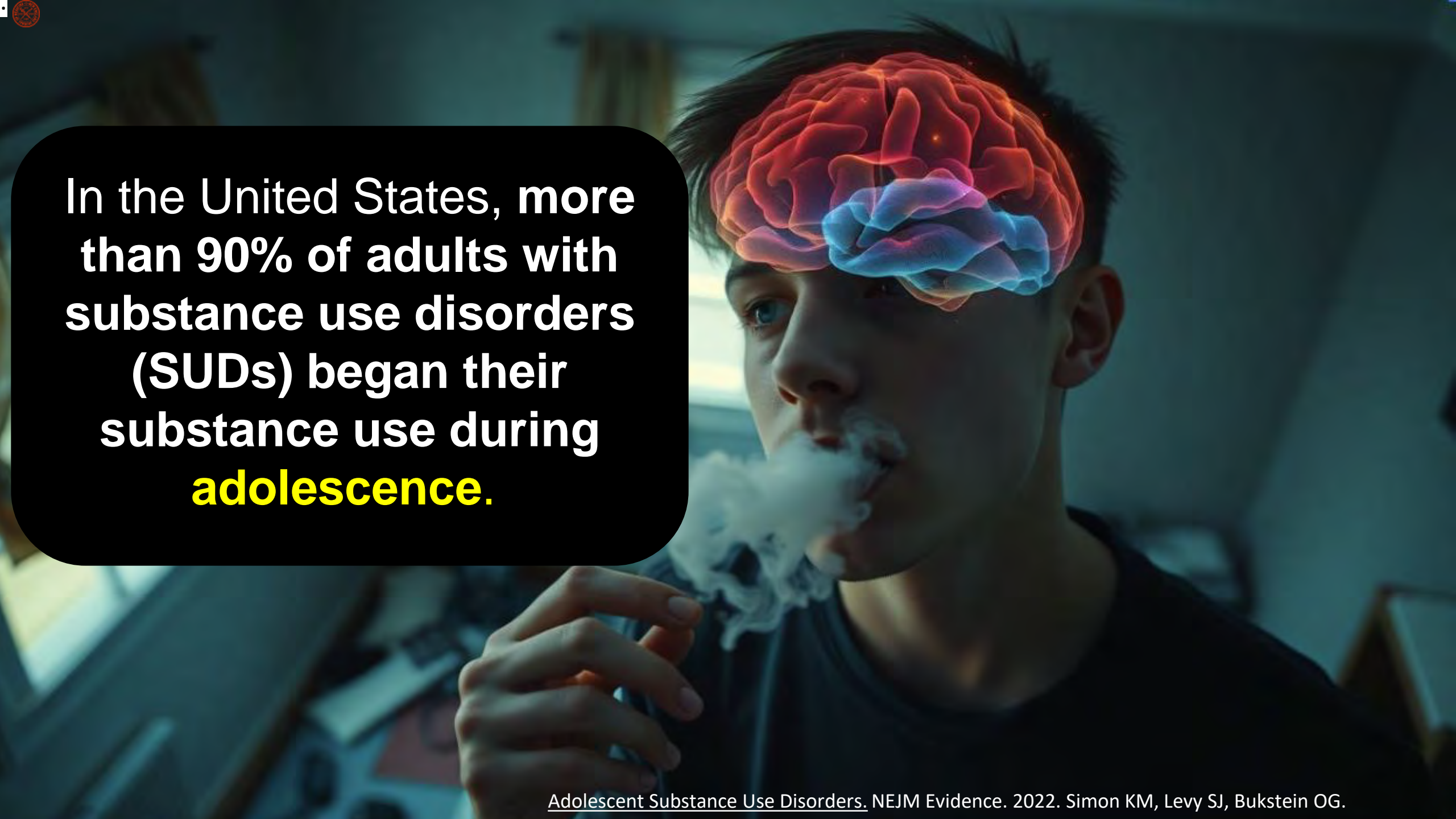
WHO WOULD??



What is Addiction?

Addiction is a primary, chronic disease of brain reward, motivation, memory and related circuitry. Dysfunction in these circuits leads to characteristic **biological, psychological, social** and **spiritual** manifestations. This is reflected in an individual pathologically pursuing reward and/or relief by substance use and other behaviors.

-ASAM

A young man with dark hair and blue eyes is shown in profile, looking to the left. He is exhaling a plume of white smoke from his mouth. Overlaid on his head is a glowing, semi-transparent brain model with a color gradient from red to blue. The background is a blurred indoor setting with warm lighting.

In the United States, more than 90% of adults with substance use disorders (SUDs) began their substance use during **adolescence.**

ARE YOUTH BRAINS DIFFERENT?

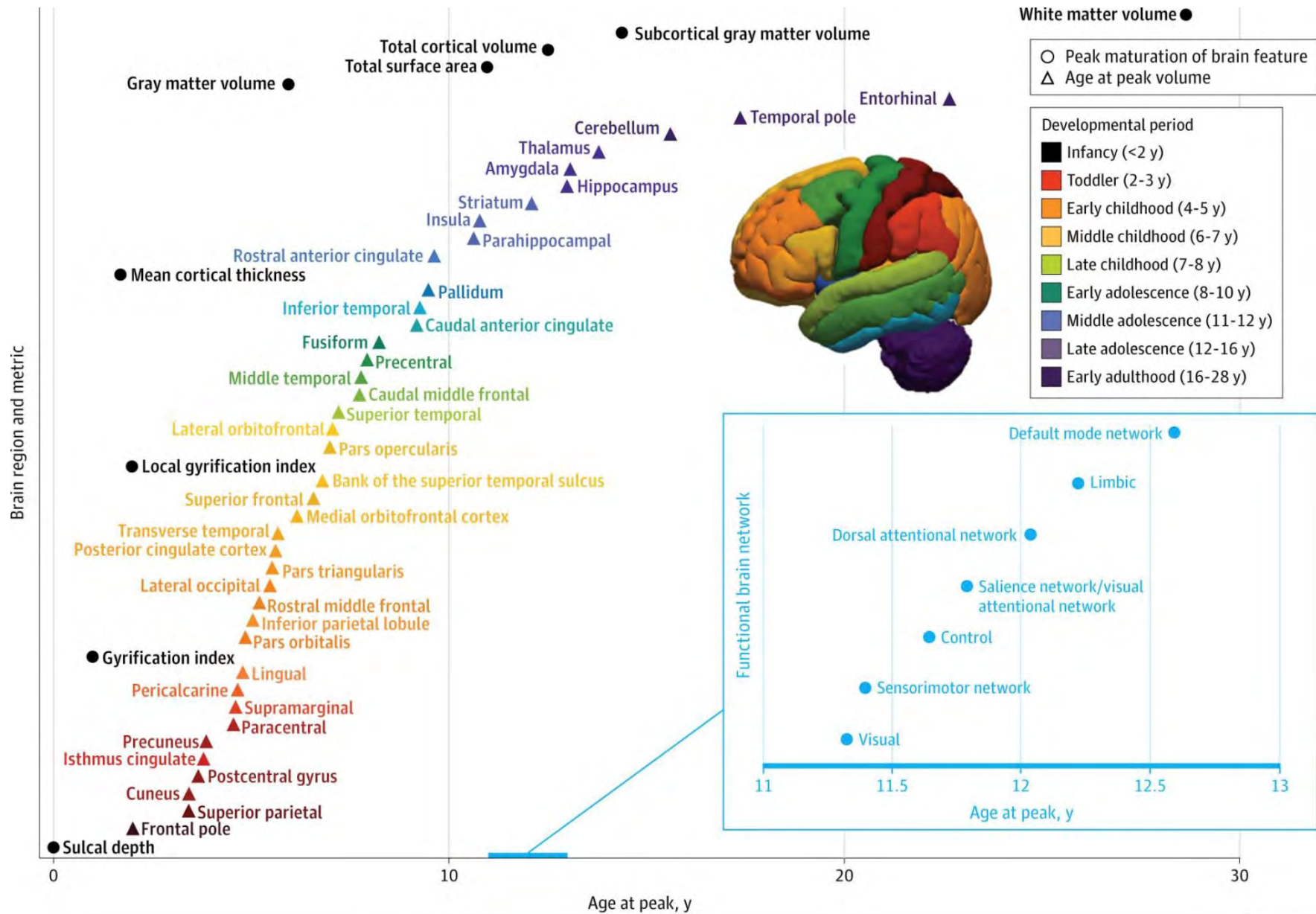


YES.
Yes, they are.



THE POINT:

The human brain does not fully form until **mid-20's**



The adolescent brain is uniquely vulnerable to addiction due to a fundamental **maturational imbalance** between **reward** and **cognitive control systems**.

WHY?

1. They are hardwired to act on impulse

- The limbic structures governing **emotional responsivity and reward** (nucleus accumbens and striatum) **mature earlier** than the prefrontal cortical regions responsible for judgment, decision-making, and impulse control.



2. Their 'highs' are *VERY HIGH*

- Adolescents possess more dopamine receptors than adults, producing a **heightened neurochemical response** to psychoactive substances.



THE RESULT:



When substances are introduced during this critical developmental window, they do not merely produce transient intoxication. They **disrupt the ongoing trajectory of brain maturation** itself.

Heavy alcohol use during adolescence is associated with **accelerated decreases in gray matter volume, slowed white matter growth, and poorer white matter integrity**, with these effects being significantly more pronounced in younger adolescents than in older ones (4-5).

Cannabis use **accelerates cortical thinning** in regions rich in CB1 receptors that are already undergoing the most dramatic developmental changes. [6]

Nicotine, opioids, and psychostimulants similarly **alter the development of the prefrontal cortex and mesolimbic dopamine pathways**, modifying reward systems, socioemotional processing, and cognition in ways that persist into adulthood. [7-8]

EFFECTS ARE

POWERFUL AND FREQUENTLY PERMANENT





The adult brain, **while still susceptible to addiction**, does not face the compounding problem of *substances simultaneously derailing the developmental processes that would otherwise build the very neural circuits needed for self-regulation.*

The Stats

The youth overdose crisis has reached **alarming** levels.

3rd

Leading cause of death in adolescents

2x

Doubling of monthly overdose fatalities (ages 10-19) from mid-2019 to 2021

300%

Increase in adolescent overdose fatalities between 2019 and 2022

1500%

Increase in adolescent overdoses reported to Poison Control (2015-2023)

Palamar JJ, Cottler LB, Black JC. Nonfatal pediatric fentanyl exposures reported to US poison centers, 2015-2023. *Am J Drug Alcohol Abuse*. 2025;51(3):339-348. doi: 10.1080/00952990.2025.2457481. Epub 2025 Mar 7.

Planalp C. During the pandemic, drug overdoses became the third leading cause of death for US adolescents. SHADAC. <https://www.shadac.org/news/adolescent-drug-overdose-deaths-pandemic-third-leading-cause-death>. Published 2025. Accessed August 18, 2025.

That's **22** kids a week.



?

HOW DO WE TREAT ?

?>

ADDICTION

?>



How do we Treat Addiction?

It depends...

Are you targeting the

DISEASE

or the

PATIENT

Neurotransmitter abnormalities

Receptor deficits

Hormonal changes

CNS rewiring

Medical complications

Withdrawals



Exp: MOUD

A loved-one

A community member

A bread-winner

A tax payer

A citizen

A whole body

A soul



Everything else!



Healing Takes a Village



BIOLOGICAL

MOUD (buprenorphine, methadone, naltrexone);
Withdrawal medications, Antidepressants,
Antianxiety, Sleep, Comorbidities



PSYCHOLOGICAL

Mental health assessments, Counseling,
Grief, Trauma, Relationships



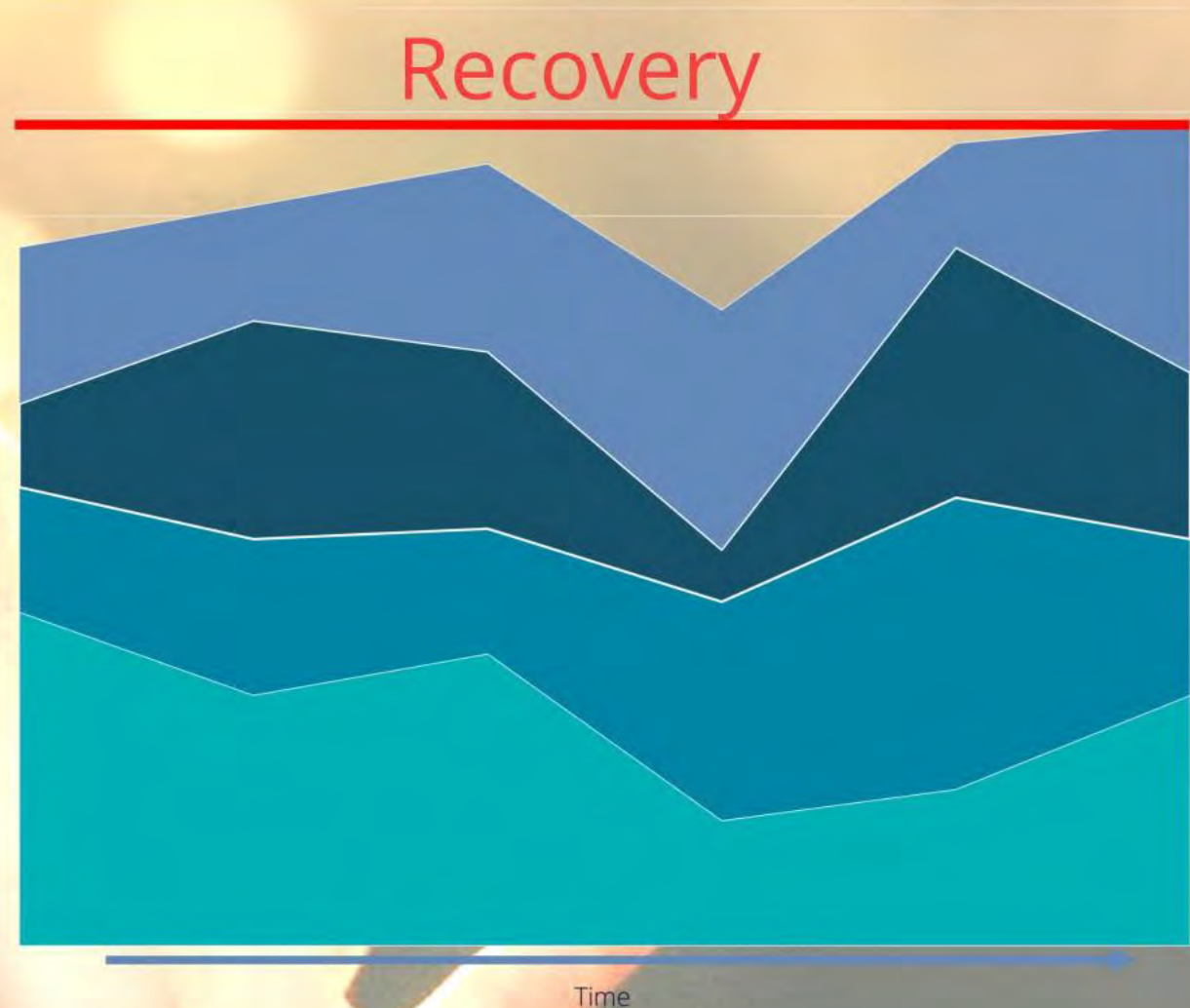
SOCIAL

Relationships, Financial, Vocational, Legal,
Living Conditions, Parental Rights



SPIRITUAL

Shame, Guilt, Moral Failures, Restoration to
Higher Power, Purpose



What Is MOUD?

MOUD: Medications for Opioid Use Disorder
~~**MAT: Medication-Assisted Treatment**~~



BUPRENORPHINE

AKA Suboxone; HCP can order/administer



METHADONE

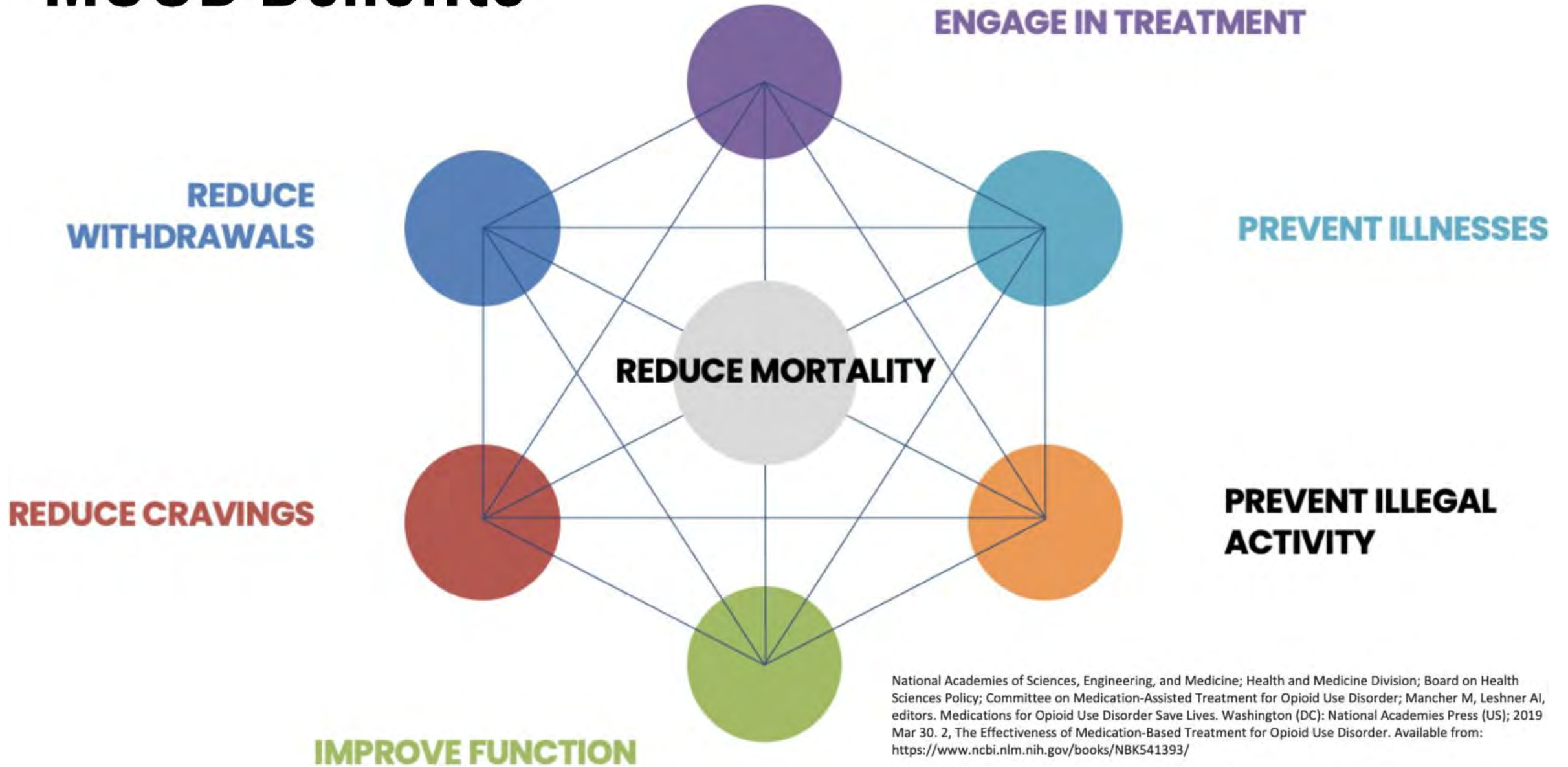
Long Acting; Need an OTP



NALTREXONE

Opioid antagonist

MOUD Benefits



National Academies of Sciences, Engineering, and Medicine; Health and Medicine Division; Board on Health Sciences Policy; Committee on Medication-Assisted Treatment for Opioid Use Disorder; Mancher M, Leshner AI, editors. Medications for Opioid Use Disorder Save Lives. Washington (DC): National Academies Press (US); 2019 Mar 30. 2, The Effectiveness of Medication-Based Treatment for Opioid Use Disorder. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK541393/>

Healthcare expenses for people with SUDs are

6 times higher

than for those without.

Evidence-based treatment, especially **MOUD** yields major savings...

Up to \$105,000 in lifetime costs per patient



Despite This...

Detox remains the **MOST COMMON** treatment for OUD

STUDIES SHOW:

**>90% OF PATIENTS WITH OUD
THAT QUIT OPIOIDS WITHOUT
MOUD WILL BE BACK ON THEM IN**

ONE YEAR

Wakeman SE, Larochelle MR, Ameli O, et al. Comparative Effectiveness of Different Treatment Pathways for Opioid Use Disorder. JAMA Netw Open. 2020;3(2):e1920622. doi:10.1001/jamanetworkopen.2019.20622

Kakko J, Svanborg KD, Kreek MJ, Heilig M. 1-year retention and social function after buprenorphine-assisted relapse prevention treatment for heroin dependence in Sweden: a randomised, placebo-controlled trial. Lancet. 2003 Feb 22;361(9358):662-8. doi: 10.1016/S0140-6736(03)12600-1. PMID: 12606177.



Behavioral Health Interventions

Behavioral Health is a

FIELD OF SCIENCE

RESEARCH-DRIVEN
EVIDENCE-BASED



Beauregard M. Functional neuroimaging studies of the effects of psychotherapy. *Dialogues Clin Neurosci*. 2014 Mar;16(1):75-81. doi: 10.31887/DCNS.2014.16.1/mbeauregard. PMID: 24733972; PMCID: PMC3984893.

Aftercare Transitions

HOUSING/FOOD SECURITY

VOCATION SUPPORT

LEGAL SUPPORT

STEPDOWN TREATMENTS

SUPPORT GROUP ENGAGEMENT

SPONSOR IDENTIFICATION

RELAPSE ACTION PLANS

NALOXONE

LONG-TERM MOUD PROVIDER

CLIENT FOLLOWUP



What do Religious/Spiritual Practices Offer in SUD?



Kelly JF, Stout RL, Magill M, Tonigan JS, Pagano ME. Spirituality in recovery: a lagged mediational analysis of [alcoholics anonymous](#)' principal theoretical mechanism of behavior change. *Alcohol Clin Exp Res.* 2011 Mar;35(3):454-63.

Grim BJ, Grim ME. Belief, Behavior, and Belonging: How Faith is Indispensable in Preventing and Recovering from Substance Abuse. *J Relig Health.* 2019 Oct;58(5):1713-1750.

Addiction Treatment in





National Guidance on Essential Specialty Substance Use Disorder (SUD) Care



Do Standards of Care for Addiction Exist?

YES.

Service Element	Description
Language services	Provision of services in preferred languages to improve accessibility and engagement.
Comprehensive assessments	Evaluation of mental health and substance use disorders to tailor individualized care plans.
Drug and alcohol testing	Baseline testing and periodic monitoring throughout programming for safety and progress.
Infectious disease testing and treatment	Screening and management for HIV, Hepatitis B and C, and sexually transmitted diseases.
Counseling services	Access to comprehensive counseling to address both substance use and co-occurring issues.
Health and SUD education	Educational programs on health and substance use disorders for patients and families.
Nicotine replacement	Offering nicotine cessation aids for tobacco use disorder management.
MOUD Initiation in OUD	Starting medications for opioid use disorder to support recovery and reduce mortality.
MAUD in AUD	Utilizing medications to treat alcohol use disorder as part of comprehensive care.
Medications for mental health disorders	Prescribing and managing necessary medications for co-occurring psychiatric conditions.

Recovery support services	Assistance with housing, vocational training, and employment to foster stability.
Peer mentor or recovery coach	Connecting patients with mentors or coaches who have lived experience in recovery.
Discharge planning	Developing personalized plans for continuity of care post-treatment.
Aftercare/continuing care	Ongoing support services following initial treatment to prevent relapse.
Overdose prevention planning	Strategies and education, including naloxone access, to reduce overdose risk.
Case Management	Coordinated care among providers and support services to address client needs.
Social skills development	Programs to build and strengthen interpersonal and coping skills.
Domestic violence assessment and management	Screening, intervention, and referrals for those impacted by interpersonal violence.
Transportation Assistance	Helping patients access treatment and support services by addressing transportation barriers.

We May Get **ONE** Shot to Get This Right



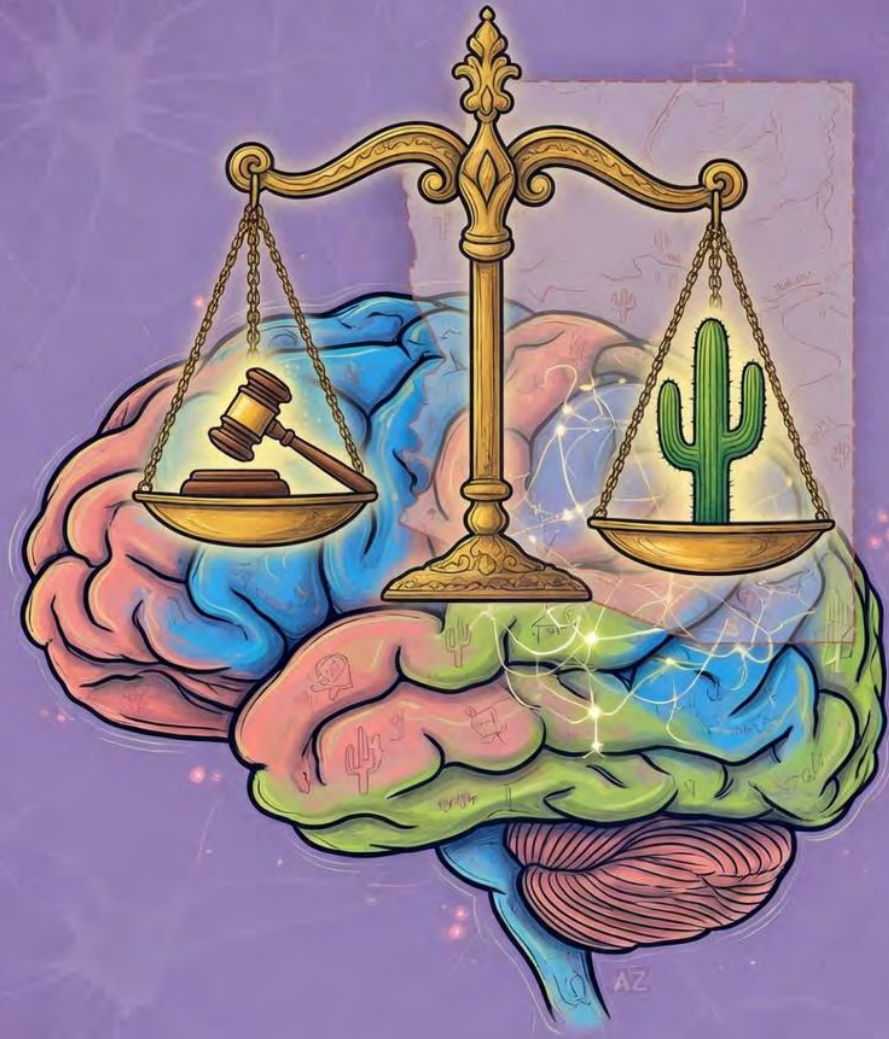
Behind Many Youth Justice Cases: A Story Written in Brain Biology

How addiction reshapes the adolescent brain — and why neuroscience can guide smarter Arizona responses that protect public safety and young lives

Michael Dekker, D.O. – Addiction Psychiatrist
Arizona Professionals Health Program
May 6th, 2026



Why This Matters to Arizona



You see the patterns daily:

- Impulsivity
- repeat offenses
- heavy substance involvement
- Arizona data: 54.4% of screened justice-involved youth test positive for drugs; 42% positive on CRAFFT; 87.1% of ADJC-committed youth have identified substance problems
- Drug offenses: 8.9% of ADJC commitments (FY2025)
- Traditional approaches often miss the neurodevelopmental drivers
- Today: Translate science into practical courtroom tools

Agenda

1. The normally developing adolescent brain
2. How addiction hijacks and reshapes it
3. Arizona youth substance use and justice context
4. Impacts on behavior, risk-taking, and legal consequences
5. Legal precedents and Arizona policy/practice
6. Evidence-based recommendations that protect communities

Addiction Reshapes the Developing Brain

INSIDE THE TEENAGE BRAIN

Adolescents are prone to high-risk behaviour

Prefrontal Cortex

Its functions include planning and reasoning; grows till 25 years

Adults Fully developed

Teens immature, prone to high-risk behaviour

Amygdala

Emotional core for passion, impulse, fear, aggression.

Adults Rely less on, it use prefrontal cortex more

Teens More impulsive



Parietal Lobe

Responsible for touch, sight, language; grows till early 20s

Adults Fully developed

Teens Do not process information effectively

Ventral Striatum

Reward centre, not fully developed in teens

Adults Fully developed

Teens Are more excited by reward than consequence

Hippocampus

Hub of memory and learning; grows in teens

Adults Fully functional, Lose neurons with age.

Teens Tremendous learning curve

- Adolescent brain is especially vulnerable
- Substances flood dopamine pathways → tolerance and craving
- Structural changes: reduced PFC gray matter, weaker impulse control

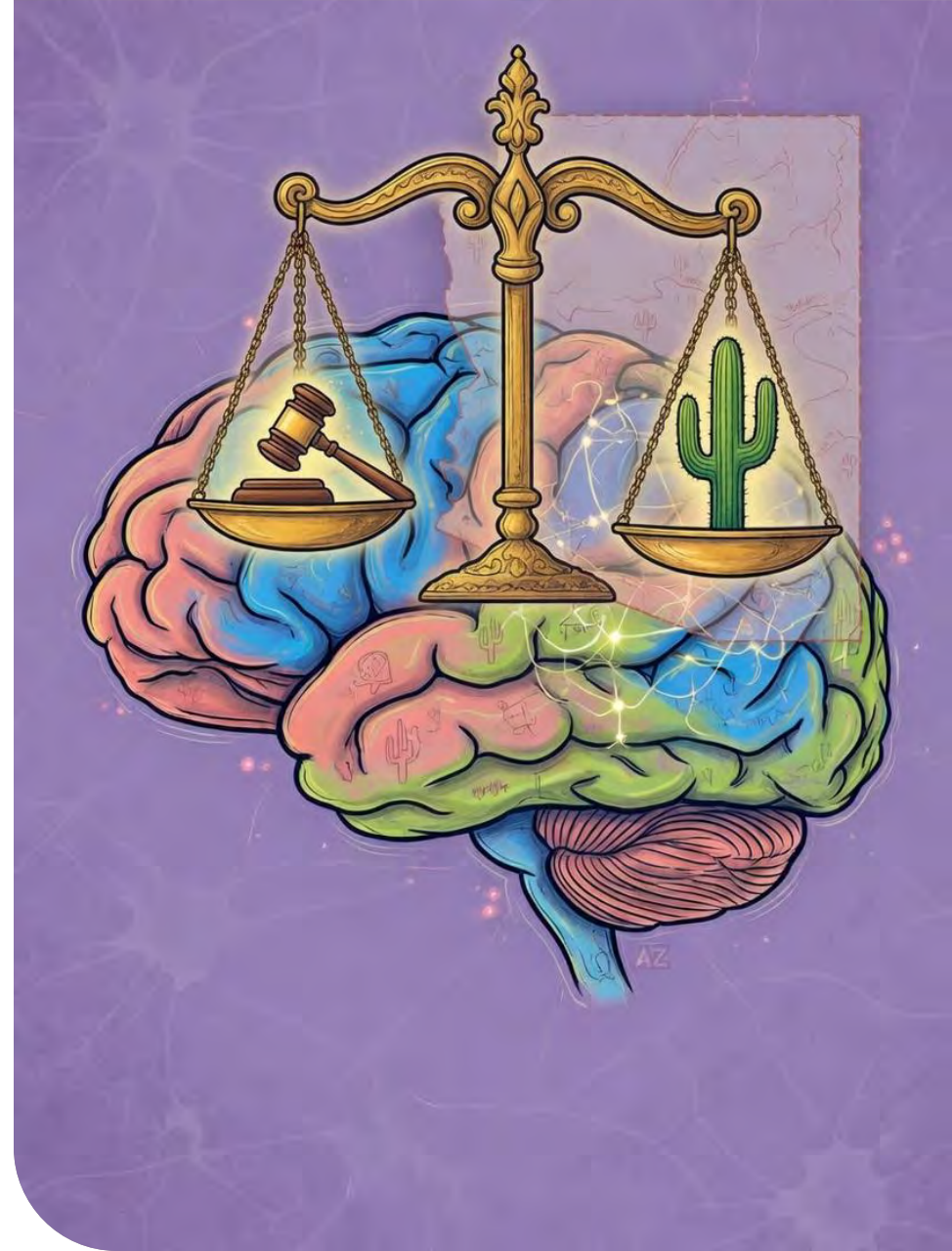


- Impaired executive function
- Heightened impulsivity
- Emotional dysregulation
- Increased risk-taking
- High brain plasticity — early intervention works

Key Neurodevelopmental Changes from Addiction

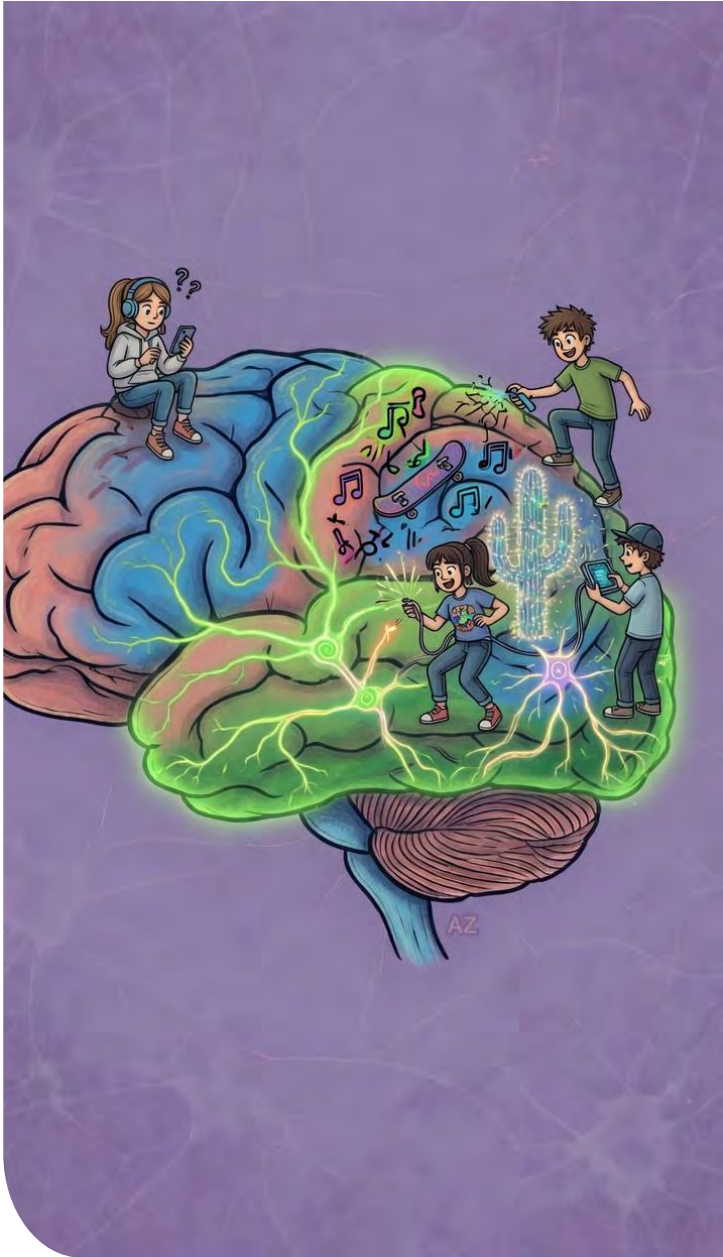
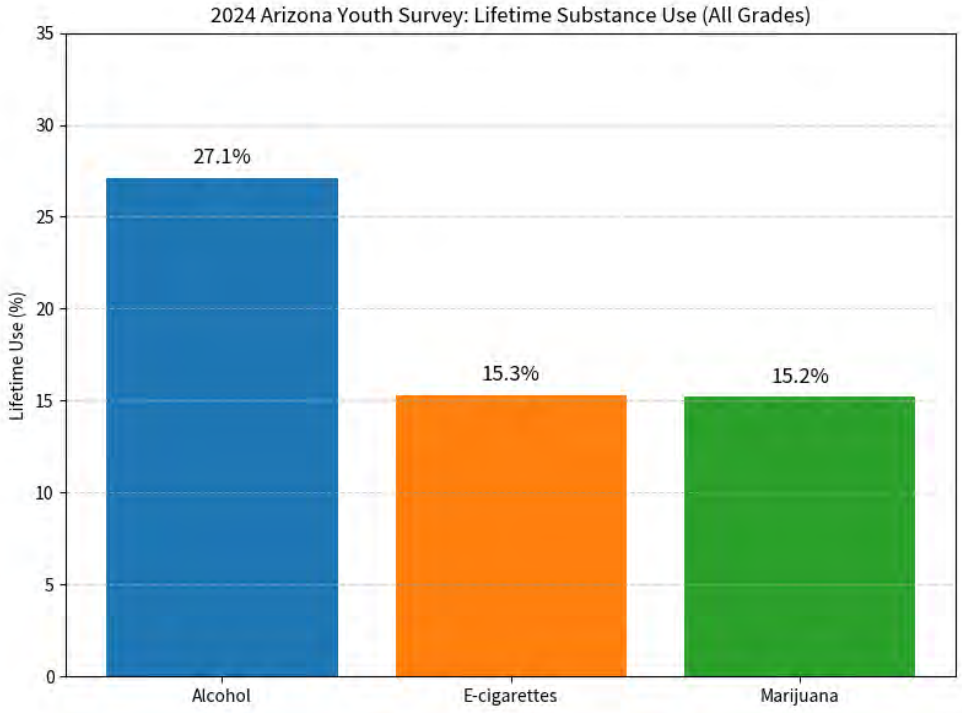
From Brain Changes → Behavior → Legal Consequences

- Higher likelihood of property crimes, risky acts, and repeat system contact
- Developmentally impaired choices with real public safety impact



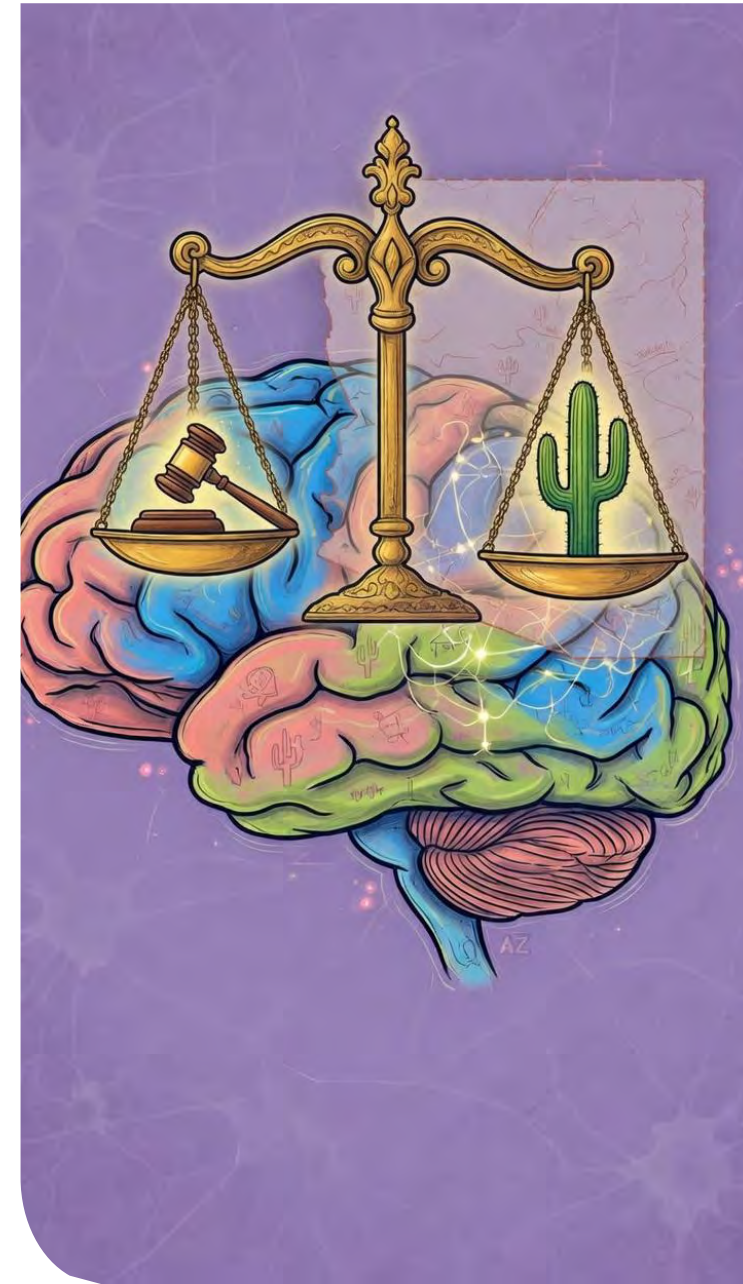
Arizona Youth Substance Use Context

- 2024 Arizona Youth Survey (42,247 students):
- Alcohol 27.1%, E-cigarettes 15.3%, Marijuana 15.2% lifetime use
- Strong link between 4+ ACEs and substance use



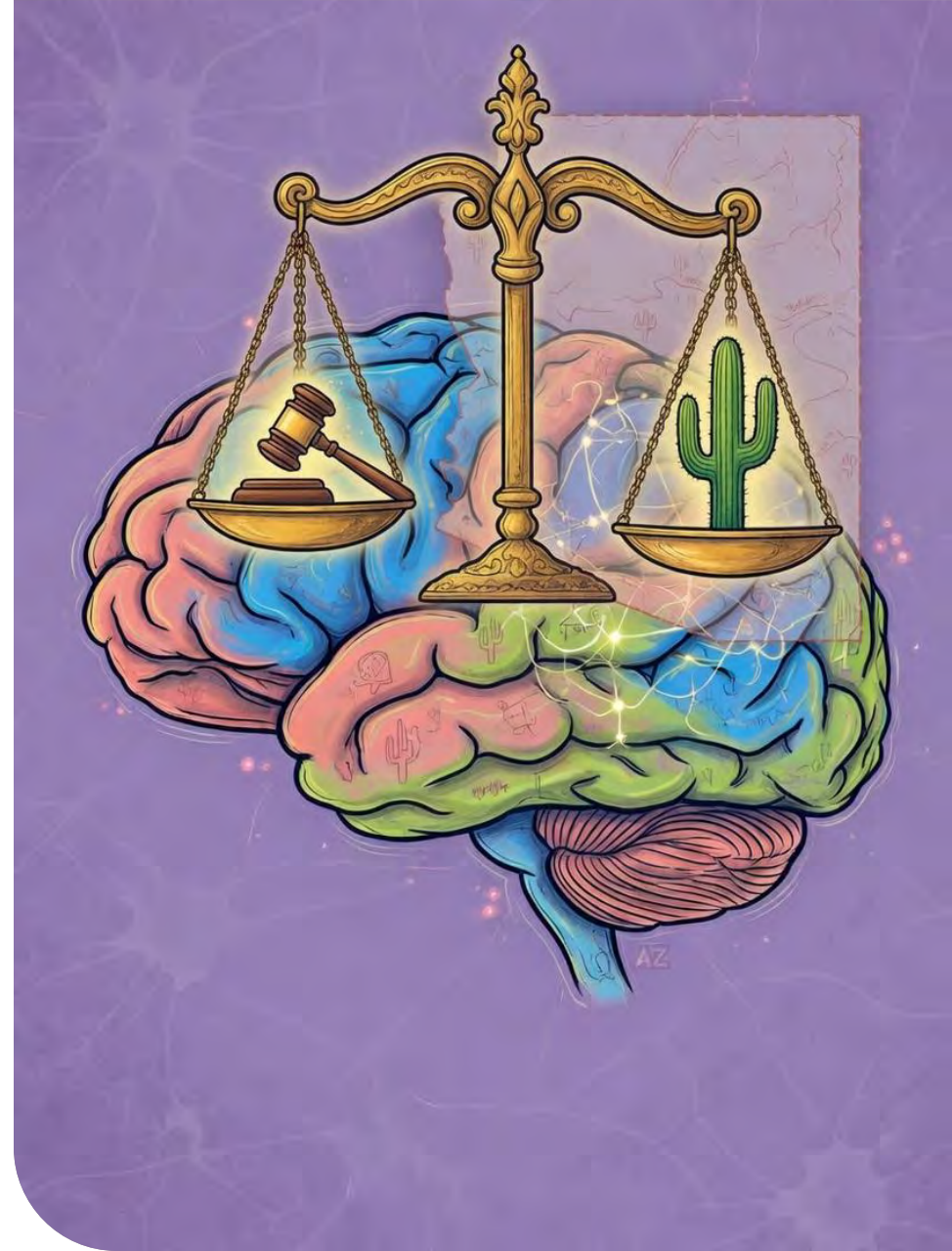
Arizona Justice System Snapshot

- Recidivism (ADJC): ~33% return to custody within 12 months
- Substance-related violations are a major driver
- Seven Challenges program participants show modestly lower recidivism



Brain Science in the Courtroom

- Roper v. Simmons (2005)
- Graham v. Florida (2010)
- Miller v. Alabama (2012)
- All three decisions cited adolescent brain immaturity and greater potential for reform.
- This is an example of Neuroscience already influencing sentencing and rehabilitation decisions establishing precedence



Translating Neuroscience into Arizona Policy & Practice

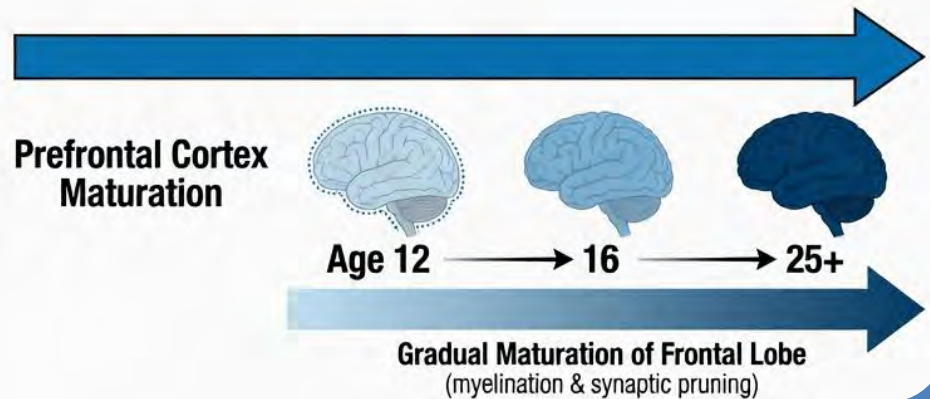
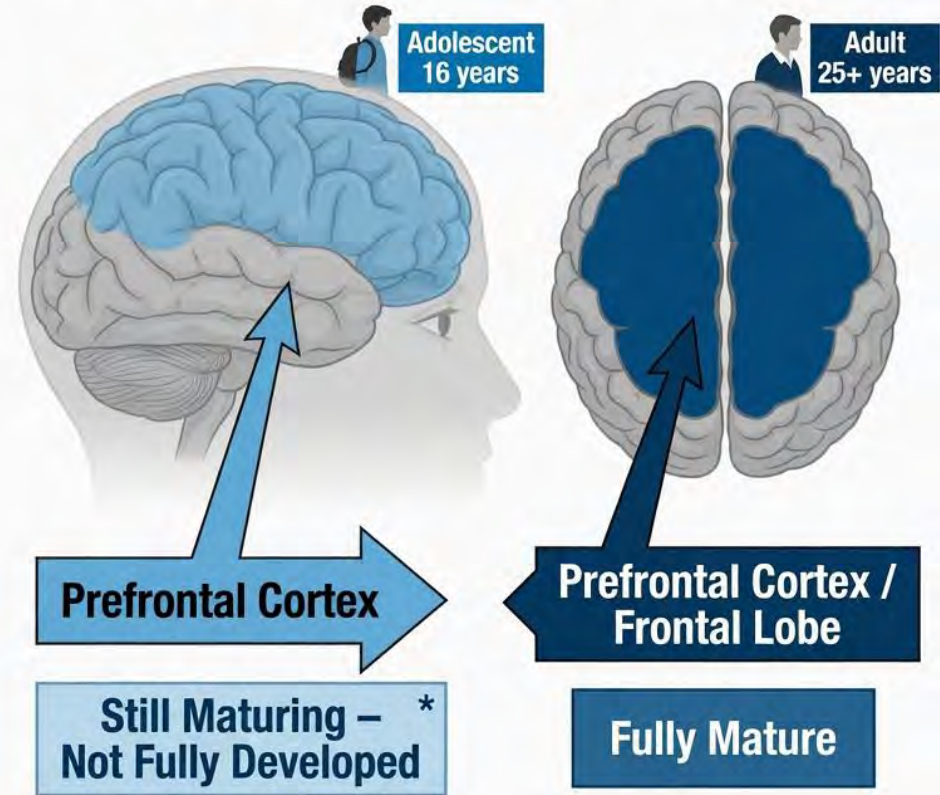
Source / Study Type	Recidivism Reduction	Details
Wilson & Hoge (2013) Meta-Analysis	~24% lower (average)	Diverted youth: 31.5% recidivism vs. 41.3% for traditionally processed youth
Restorative Justice Diversion	~33% lower	Reoffense rates one-third lower; subsequent crimes less severe
Multiple U.S. Evaluations	20–45% lower	Ranges from general diversion (20%) to stronger restorative programs (up to 45%)
Hennepin County (MN) Study	50% lower rearrest rate	18% vs. 36%
San Francisco RJ Diversion	44% less likely to be rearrested	Felony-level youth
Schwalbe et al. (2012) Meta-Analysis	Overall modest / mixed; family treatment best	Family-based programs showed strongest effect (OR=0.57)

In Arizona justice settings, 42% of screened justice-involved youth screened positive on the CRAFFT. Diversion-first programs (also called pre-charge or pre-adjudication diversion) generally reduce recidivism compared to traditional court processing for justice-involved youth. This provides time and guidance for a brain in development

- **C** – Have you ever ridden in a **CAR** driven by someone (including yourself) who was “high” or had been using alcohol or drugs?
- **R** – Do you ever use alcohol or drugs to **RELAX**, feel better about yourself, or fit in?
- **A** – Do you ever use alcohol or drugs while you are by yourself — **ALONE**?
- **F** – Do you ever **FORGET** things you did while using alcohol or drugs?
- **F** – Do your **FAMILY** or **FRIENDS** ever tell you that you should cut down on your drinking or drug use?
- **T** – Have you ever gotten into **TROUBLE** while you were using alcohol or drugs?

– Adolescent 16 years

– Adult 25+ years



CRAFFT is a widely used, validated screening tool for identifying substance use risk and substance use disorders (SUD) in adolescents aged 12–21.

Key Evidence-Based TREATMENT Models in Use

Multisystemic Therapy (MST):

An intensive, home- and community-based program (typically 3–5 months, ~60 hours of contact) for high-risk youth (chronic or serious offenders at risk of out-of-home placement). It addresses multiple systems—family, peers, school, neighborhood—to improve parenting, reduce antisocial behavior, and build prosocial skills. Therapists provide frequent sessions (often multiple per week), 24/7 crisis support, and collaboration with probation. Arizona contracts for MST via the Administrative Office of the Courts (AOC), targeting high-risk juveniles per the Arizona Youth Assessment System (AZYAS). Strong evidence for reducing re-arrests, out-of-home placements, and substance use in justice-involved youth.

Key Evidence-Based TREATMENT Models in Use

1. Functional Family Therapy (FFT):

1. A short-term, family-focused intervention emphasizing communication, problem-solving, and behavior change within the family. Used in probation and court settings to reduce conflict and delinquency. Arizona AOC contracts support it as an evidence-based option.

2. Cognitive-Behavioral Therapy (CBT)-Based Approaches:

1. Core to ADJC secure care (e.g., Adobe Mountain School) and community programs. These target thinking patterns, aggression, skills deficits, and criminogenic factors. ADJC uses group/individual treatment aligned with RNR principles (assess risk/needs, match intensity, target dynamic factors). Research shows CBT is among the most effective for reducing recidivism.

Key Evidence-Based TREATMENT Models in Use

- Trauma-Informed and Trauma-Specific Care:
 - Many justice-involved youth have trauma histories. Programs integrate trauma-focused CBT, PTSD treatment, and trauma-responsive environments. ADJC emphasizes this across services; juvenile drug courts and specialty courts also address co-occurring issues.
- Substance Use Treatment:
 - Integrated via Juvenile Drug Courts (often with Reclaiming Futures model), Residential Substance Abuse Treatment (RSAT) in facilities, and community programs. Evidence-based elements include motivational interviewing, CBT for substance use, prosocial activities, mentoring, frequent testing (for higher-risk youth), and gender-responsive approaches. Evaluations (e.g., University of Arizona-led) show reductions in substance use and recidivism, especially for high-need youth.

Broader Frameworks and Practices

- Risk-Need-Responsivity (RNR) and Arizona Youth Assessment System (AZYAS):
 - Standardized assessment of 12 domains (risk to re-offend, family, peers, substance use, aggression, school, etc.) to tailor treatment intensity and targets. Used statewide for case planning and progress monitoring.
- Positive Behavior Intervention and Supports (PBIS): Framework in ADJC facilities for behavioral support
- Juvenile Specialty Courts: Recovery Courts (substance use) and Health/Wellness Courts (mental health) combine supervision, treatment, and accountability with evidence-based components.

Diversion and Community-Based Alternatives: For lower-risk offenders, including restorative justice (e.g., Community Justice Boards in Pima County), community restitution, and prosocial/mentoring programs to prevent deeper system involvement.

TRANSLATING NEUROSCIENCE INTO ARIZONA
POLICY & PRACTICE



Mercy Care
JJET Model
stands for
Juvenile
Justice
Engagement
Team.

What JJET
Does (Core
Purpose)

- Ensures continuity of behavioral health and substance use services before, during, and after detention/release.

It is a specialized care coordination program run by Mercy Care (an Arizona AHCCCS Medicaid managed care organization / Regional Behavioral Health Authority) focused on justice-involved youth in Arizona (primarily Maricopa, Pinal, and Gila counties).

Provides "Reach-In" care coordination for youth who are detained in juvenile detention centers or committed to the Arizona Department of Juvenile Corrections (ADJC).

Helps resolve service barriers for probation officers, families, and treatment providers.

Juvenile Justice engagement team



Protecting Public Safety AND Young Lives



Lower recidivism = safer Arizona communities




Leverage adolescent brain plasticity for real rehabilitation



Strong return on investment (\$4–\$7 saved per \$1)

Conclusion

Behind many cases is a brain still under construction
— sometimes hijacked by addiction



Judges are uniquely positioned to apply this
science



Ask: “What does this young person need to finish
building a healthy brain and a law-abiding life?”

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A photograph of a prison cell. The door is closed and has vertical metal bars. The walls are light-colored with significant peeling paint, especially near the bottom. The floor is a plain, light-colored surface. The word "QUESTIONS" is overlaid in large white letters in the center of the image.

QUESTIONS

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