

# **NIDA Progress & Priorities**

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**National Institute on Drug Abuse**

# NIDA FY2022-2026 Strategic Plan



# Brain Development and the Effects of ACE and Genetics

## HEALthy Brain and Child Development (HBCD) Study



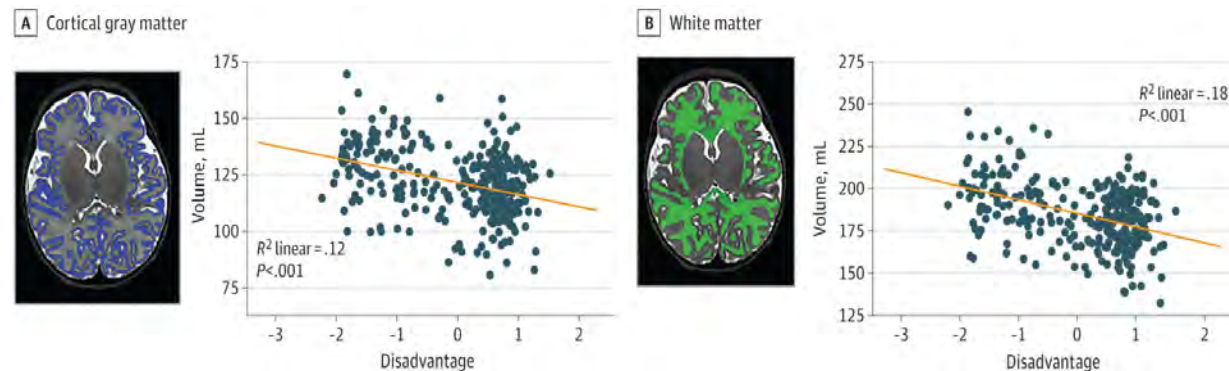
Longitudinal study to understand normative neurodevelopment from birth to 9-10 years and assess impact of in utero exposures to drugs and harmful environments

## Adolescent Brain Cognitive Development (ABCD) Study

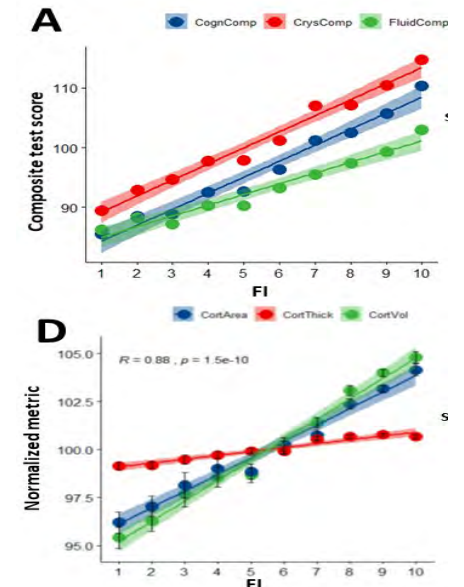
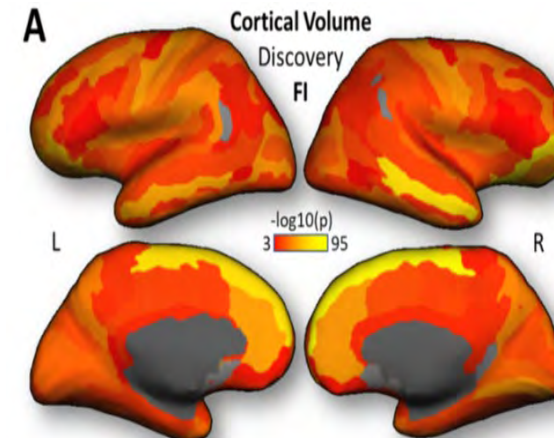


Longitudinal study of about 10,000 children from ages 9-10 through early adulthood to assess factors that influence individual brain development trajectories and functional outcomes

### Correlation Between Brain Volumes and Maternal Social Disadvantage Factor



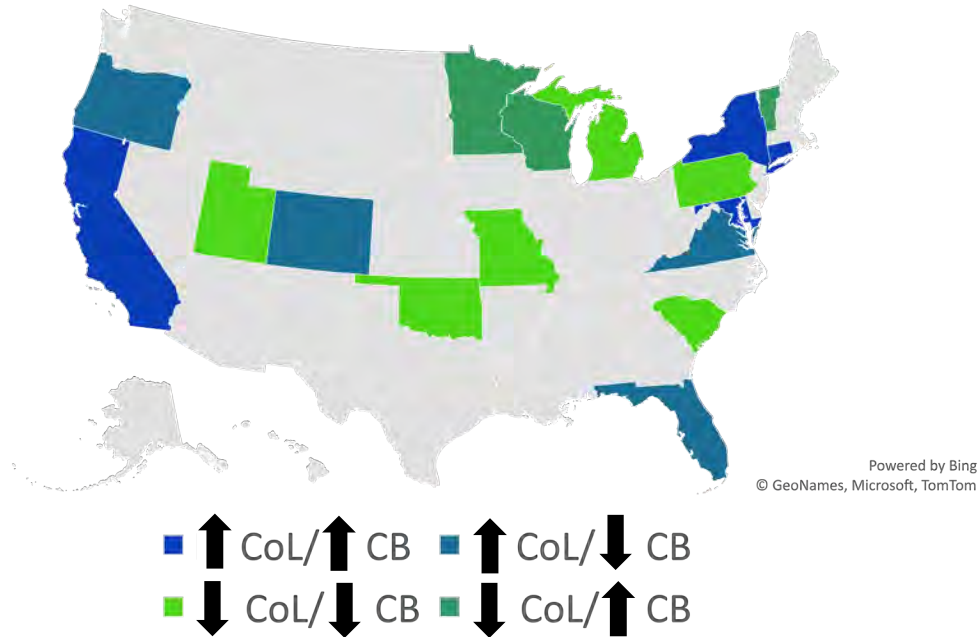
### Effects of family income (FI) on cortical volume and cognitive performance



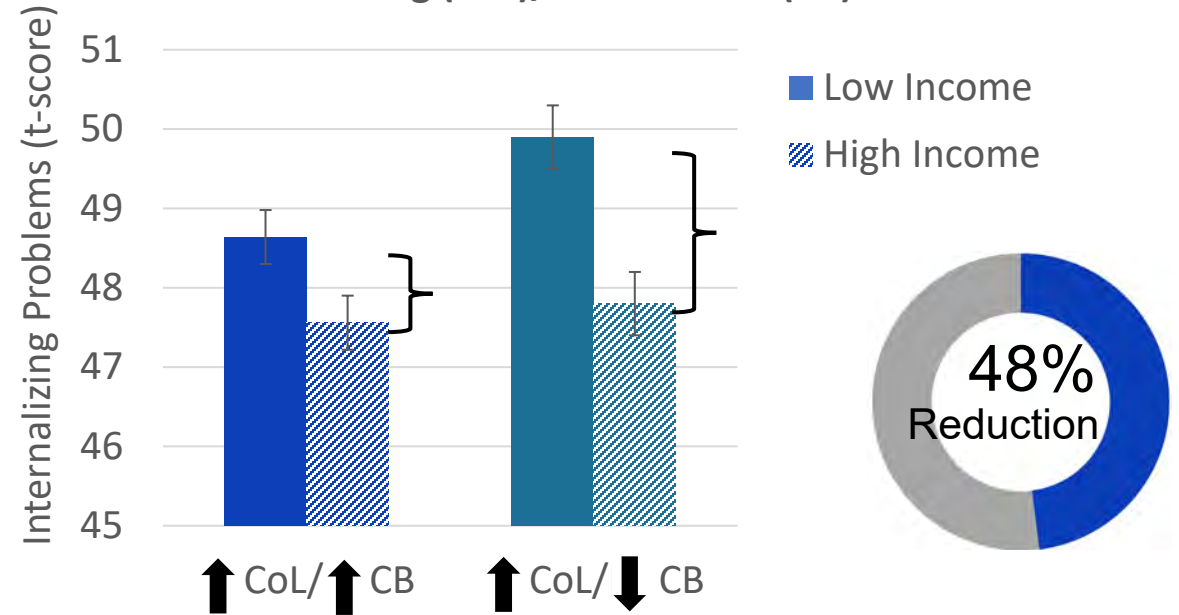
# ABCD Study: Implications to Prevention

## Antipoverty Programs Associated with Reduced Disparities in Brain Development and Mental Health

Cost of Living (CoL), Average Cash Benefit (CB) by State



Internalizing Problems by  
Cost of Living (CoL)/Cash Benefit (CB)



Controlled for:

- Population density
- State economic conditions (economic inequality, unemployment rate),
- Non-economic characteristics social and political factors
- Education system equity (state-funded preschool enrollment, reading proficiency among students from low-income backgrounds).

# 2022-2023: Provisional\* Drug Overdose Deaths

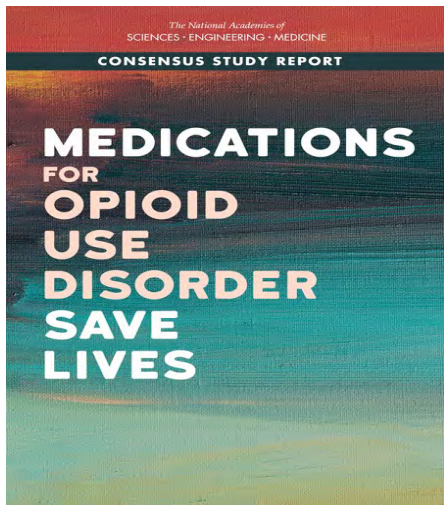
## 12-months ending in select months

	ALL DRUGS	HEROIN	NAT & SEMI SYNTHETIC	METHADONE	SYNTHETIC OPIOIDS (mainly illicit fentanyl)	COCAINE	OTHER PSYCHO-STIMULANTS (mainly meth)
4/2022*	109,502	8,077	13,205	3,507	73,807	26,404	34,335
9/2022*	109,138	6,642	12,388	3,414	74,181	27,293	34,599
4/2023*	111,355	5,168	11,543	3,434	77,415	29,360	36,178
Percent Change 4/22-4/23	1.7%	-36.0%	-12.6%	-2.1%	4.9%	11.2%	5.4%

\*NCHS Provisional drug-involved overdose death counts are PREDICTED VALUES, 12 months ending in select months. The numbers for 2022 differ from final data in slide 1 because provisional data includes all deaths that occurred in the US including foreign residents. Final data through 2021 on slide 1 is limited to deaths in US residents.

<https://www.cdc.gov/nchs/nvss/vsrr/drug-overdose-data.htm>





## Reduced Risk of Overdose in Pregnant Women Given Medications for OUD

### FDA-Approved Medications

#### Methadone



In use since the 1960s, the slow-acting synthetic opioid agonist effectively treats moderate to severe heroin addiction. It is only available in heavily regulated clinics.

#### Buprenorphine/Suboxone



Approved in 2002, the long-acting opioid agonist relieves drug cravings with fewer side effects than other opioids and is available by prescription from certain doctors. Suboxone is designed to deter illicit use.

#### Naltrexone/Vivitrol

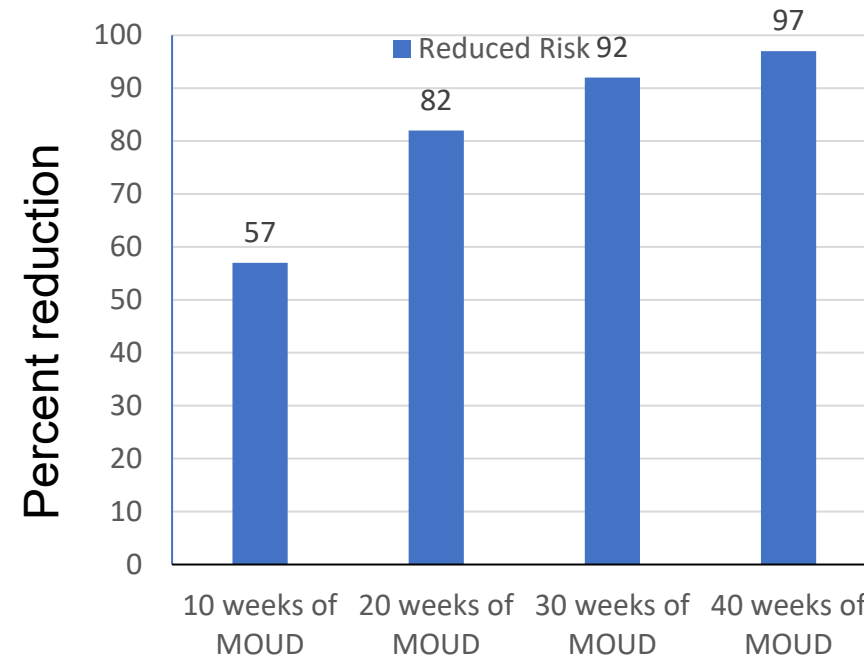


Approved in pill form in 1984, it has been available since 2010 as a 30-day time-release injectable medication called Vivitrol. Patients must be completely off all opioids for seven to 10 days. Both block the effect of opioids, do not activate the opioid receptor system, and do not cause physical dependence.

#### Naloxone



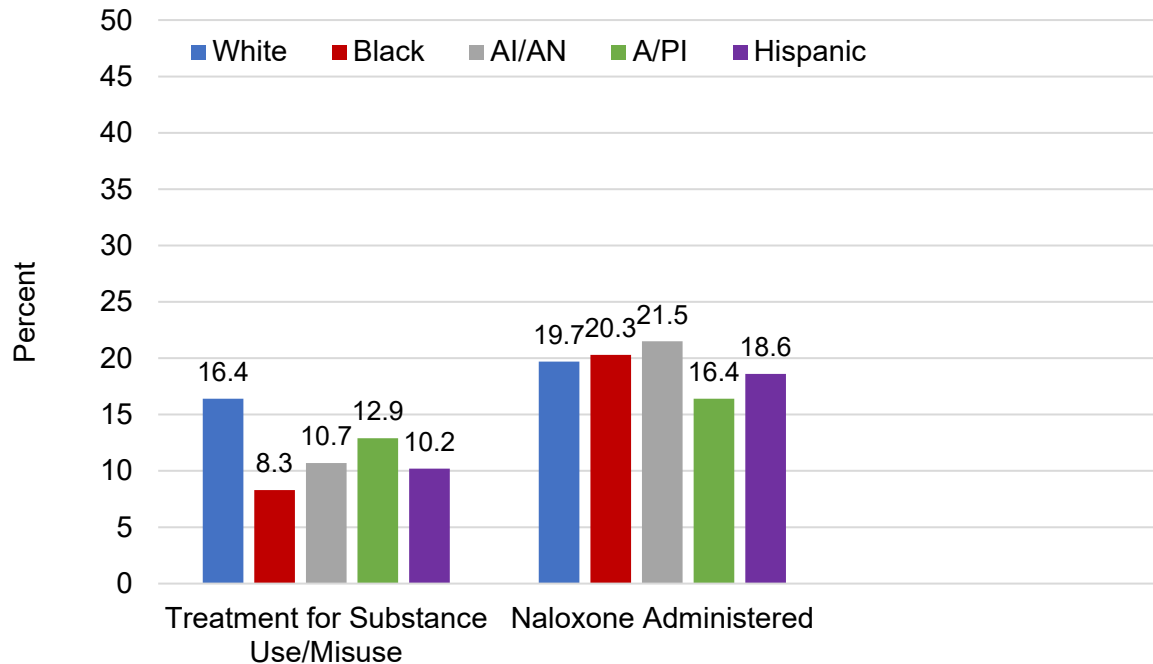
Approved in 1971, the short-acting medication, also known as Narcan and Evzio, reverses opioid overdoses but does not treat opioid addiction.



# Implementation Science

Medication for OUD are safe and effective and prevent overdose mortality, but only a minority of patients who could benefit from them receives them

## Drug Overdose Deaths: 2019–2020



Kariisa M et al., MMWR Morb Mortal Wkly Rep. 2022

## NIDA Clinical Trials Network



HEALTHCARE

*Effectiveness of treatments in diverse clinical settings and populations*

**HEAL**  
INITIATIVE

**JCOIN**  
JUSTICE COMMUNITY OPIOID INNOVATION NETWORK

*Build Evidence for OUD treatment in justice populations*



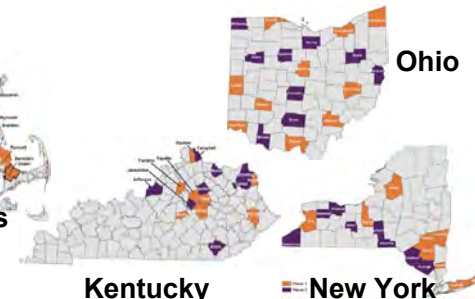
JUSTICE

**HEAL**  
INITIATIVE

## Healing Community Study



Massachusetts



Ohio

Kentucky

New York

COMMUNITIES

# Harm Reduction

Model of substance use care created by and for people who use drugs, that aims to reduce health and safety issues associated with drug use

## Syringe Exchanges and Syringe Services Programs (SSPs)



SSPs **save lives** by lowering the likelihood of deaths from overdoses.



Providing testing, counseling, and sterile injection supplies helps prevent outbreaks of other diseases. For example, SSPs are associated with a **50% decline** in the risk



Users of SSPs were **three times more likely** to stop injecting drugs.

## Naloxone



## Drug Testing



## Fentanyl and Xylazine Test Strips



## Overdose Prevention Centers





# Harm Reduction Research Network (10 R01s, 1 R24)

**Purpose:** Increase our understanding of the effectiveness, implementation, and impact of existing and new harm reduction strategies

## Novel harm reduction approaches

- Community drug checking
- Overdose prevention centers
- Meth sobering center
- Contingency management

## Novel settings for and modes of service delivery

- Emergency department
- Mobile apps
- Hotline
- Text messages
- Mail delivery
- Secondary distribution
- Remote lockboxes

## Understanding and addressing barriers

- Limited access
- Not using naloxone when it is available
- Burnout & trauma from responding to overdose
- State-level policy barriers

## Reaching understudied populations

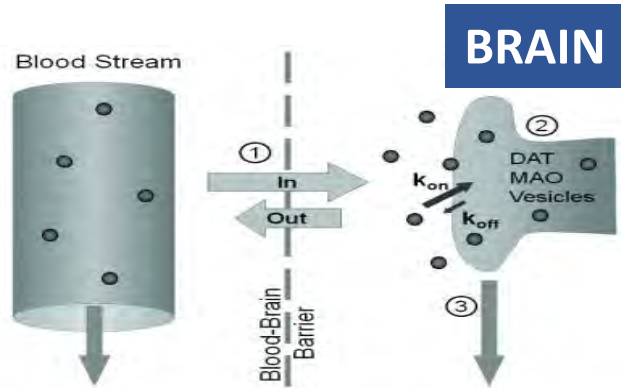
- Racial/ethnic minority groups
- Women
- Rural communities
- People who use stimulants

## Coordination Center – 4 cores

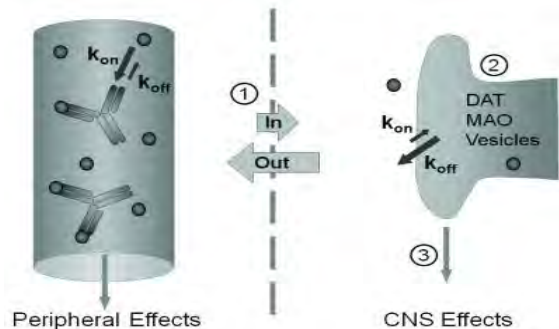
- Communication and Coordination
- Data Harmonization and Methodology
- Community and Stakeholder Engagement
- Dissemination and Translation

# Medications Development: Immunotherapies

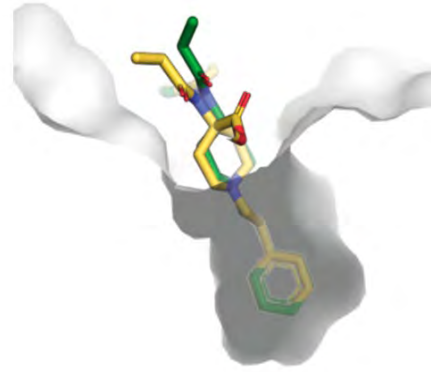
## BEFORE Anti-Meth Antibody Treatment



## AFTER Anti-Meth Antibody Treatment

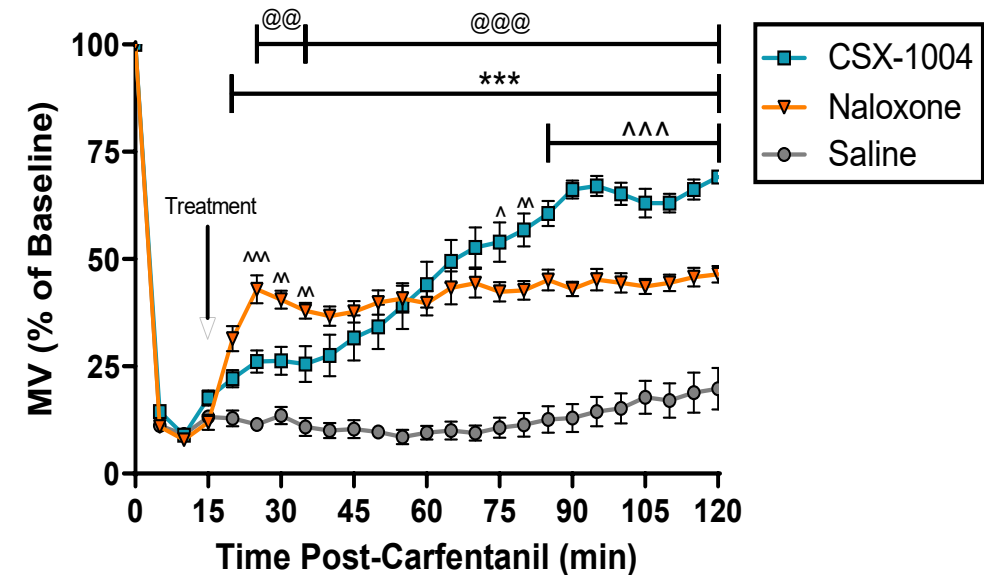


Fentanyl  
Carfentanil



CSX-1004 binds to fentanyl with picomolar affinity developed for prevention of fentanyl overdose

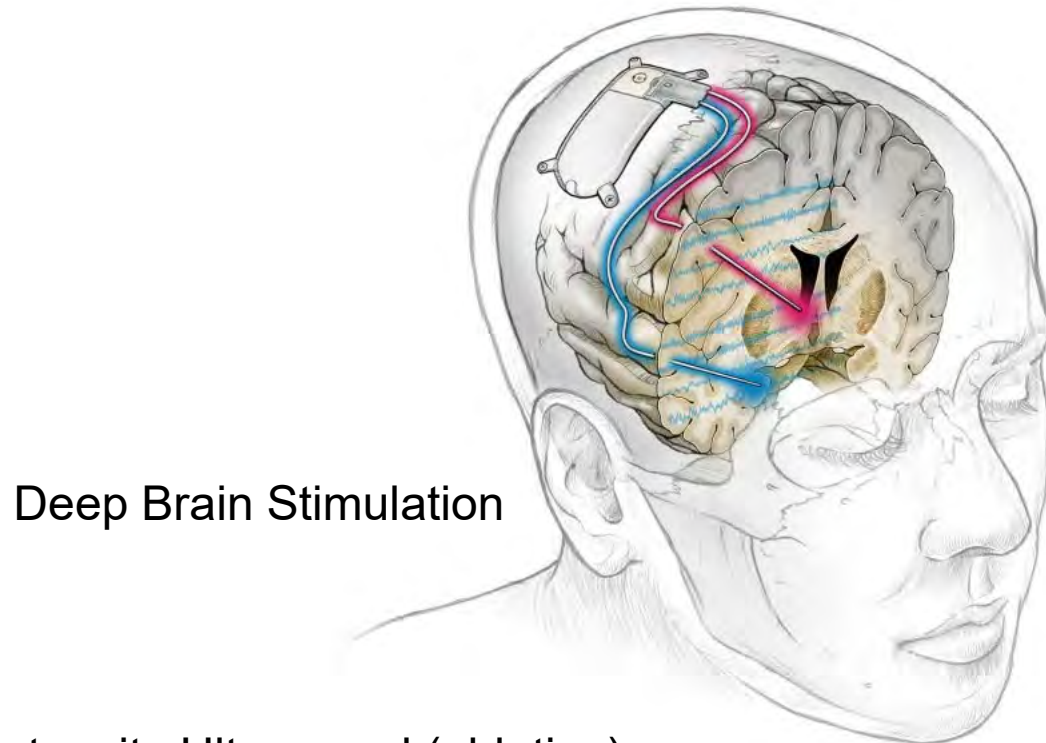
Cessation Therapeutics  
Announces FDA Authorization  
for First-in-Human Clinical  
Trial of Antibody for  
Prevention of Fentanyl  
Overdose *Trial to start August of 2023*



# Treatment Development: Neuromodulation

Identification of the brain networks underlying SUD provide therapeutic targets for neuromodulation

## Invasive Neuromodulation Techniques



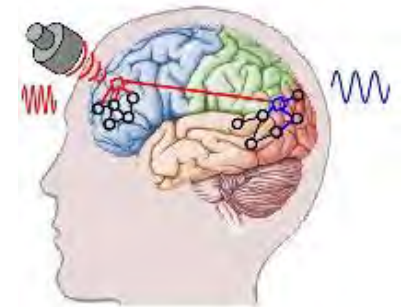
High Intensity Ultrasound (ablative)

## Non Invasive Neuromodulation Techniques

Transcranial  
Magnetic  
Stimulation  
(TMS)



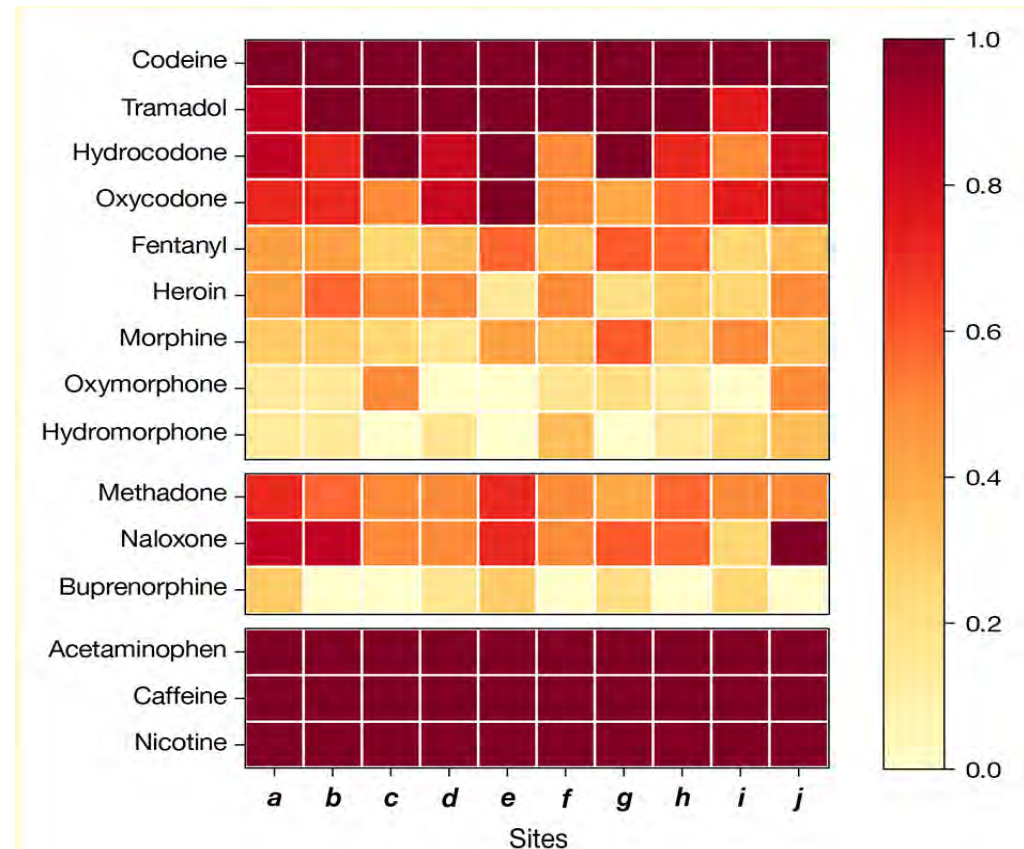
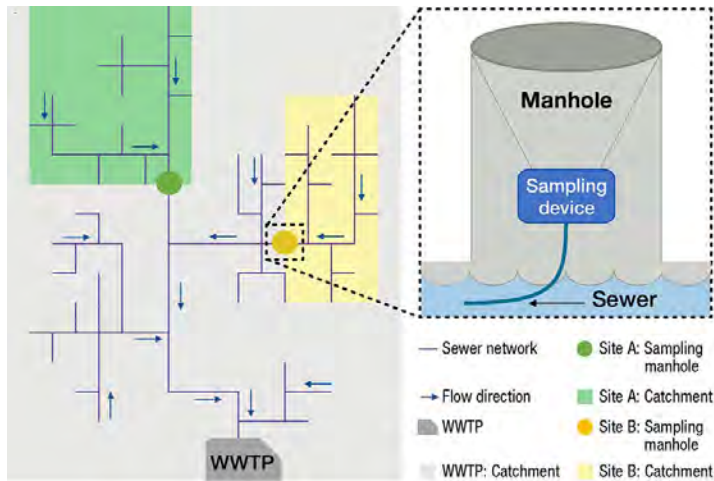
Transcranial Direct  
Current Stimulation  
(tDCS)



Low Intensity Ultrasound

# Translational Science

## Drug Exposures in the Community Can Be Measured Using Wastewater



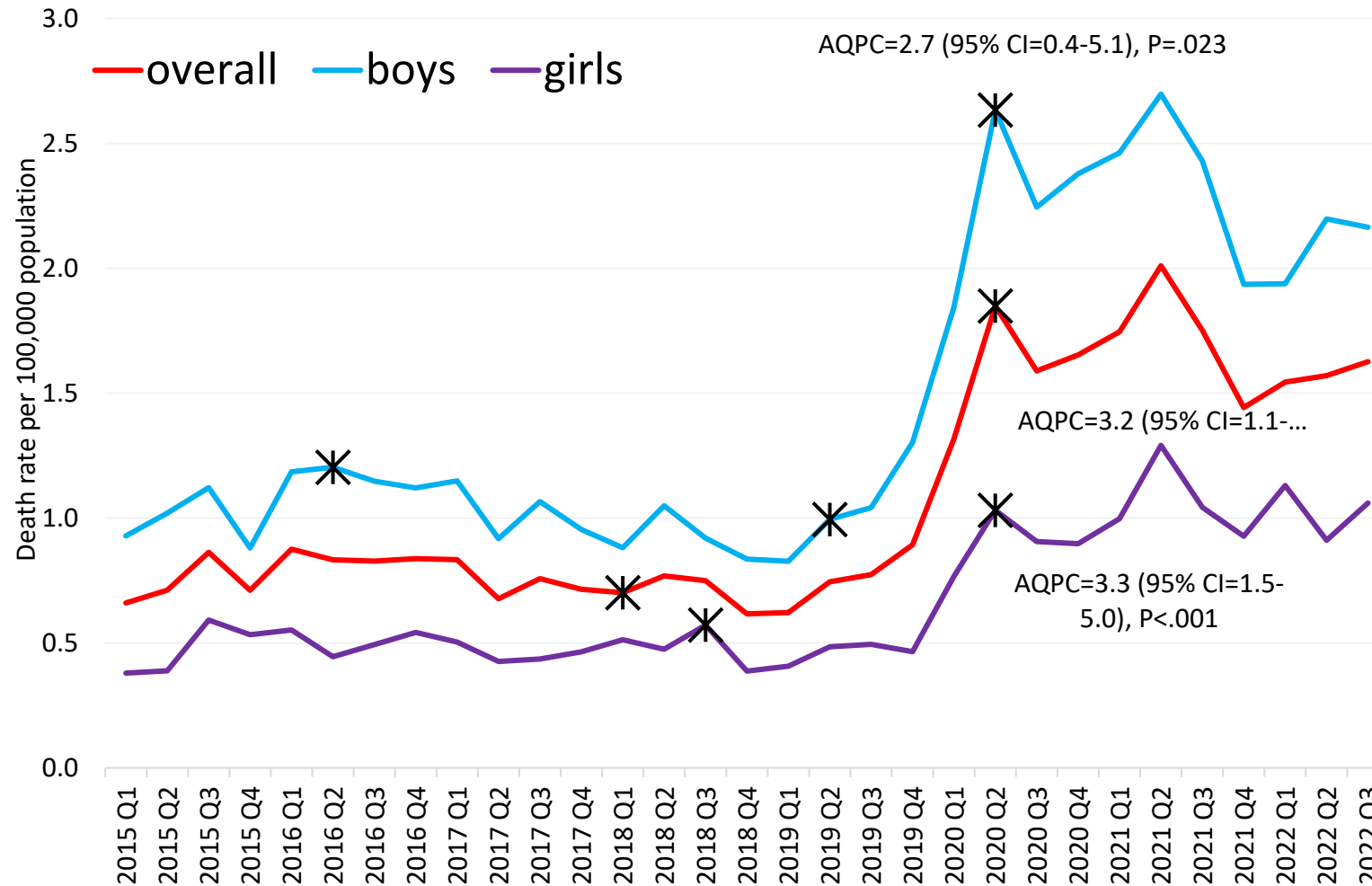


# Multifaceted Approach is Needed to Address Overdose Deaths

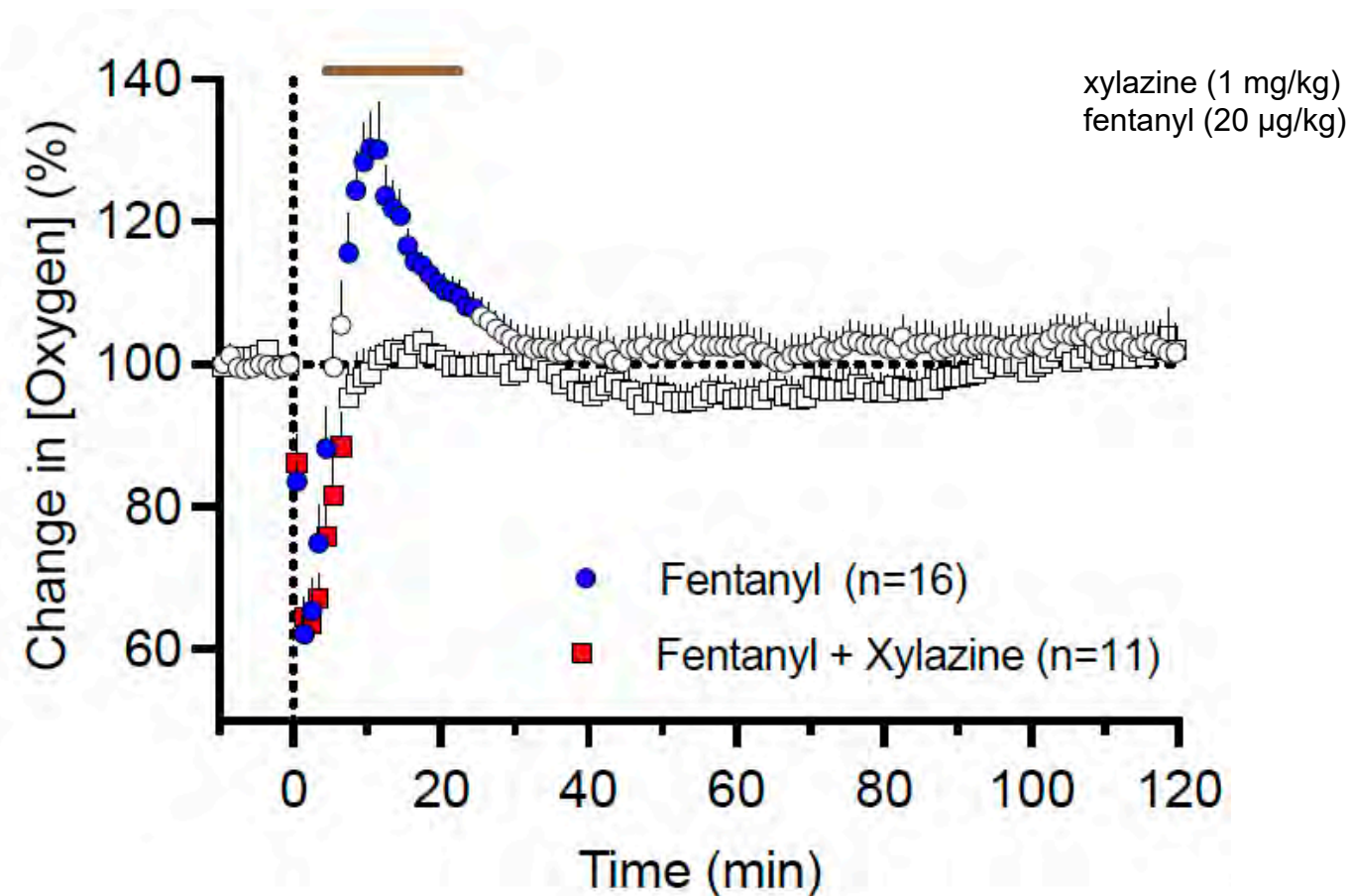
- Expanding treatment of OUD is **CRUCIAL**, but not sufficient.
- Treatment of Substance Use Disorders in addition to OUD is **now necessary** to prevent overdoses.
- Need to develop **antidotes from overdoses** including drug combinations
- Need to expand **evidenced based harm reduction practices**
- **Prevention of drug use including** occasional illicit prescription drug use is **now necessary** to prevent overdoses.
- Need of **timely access to data** on drug overdoses and on emerging new drugs and drug mixtures (xylazine, stimulants) at the regional level.

**THANK YOU!**

# Unintentional Drug Overdose Death Rates among US Youth Aged 15-19



# Xylazine effects on Brain Oxygenation



Xylazine + Fentanyl combination induced a similar peak hypoxic response than Fentanyl alone but blocked hyperoxic compensatory response observed with fentanyl