

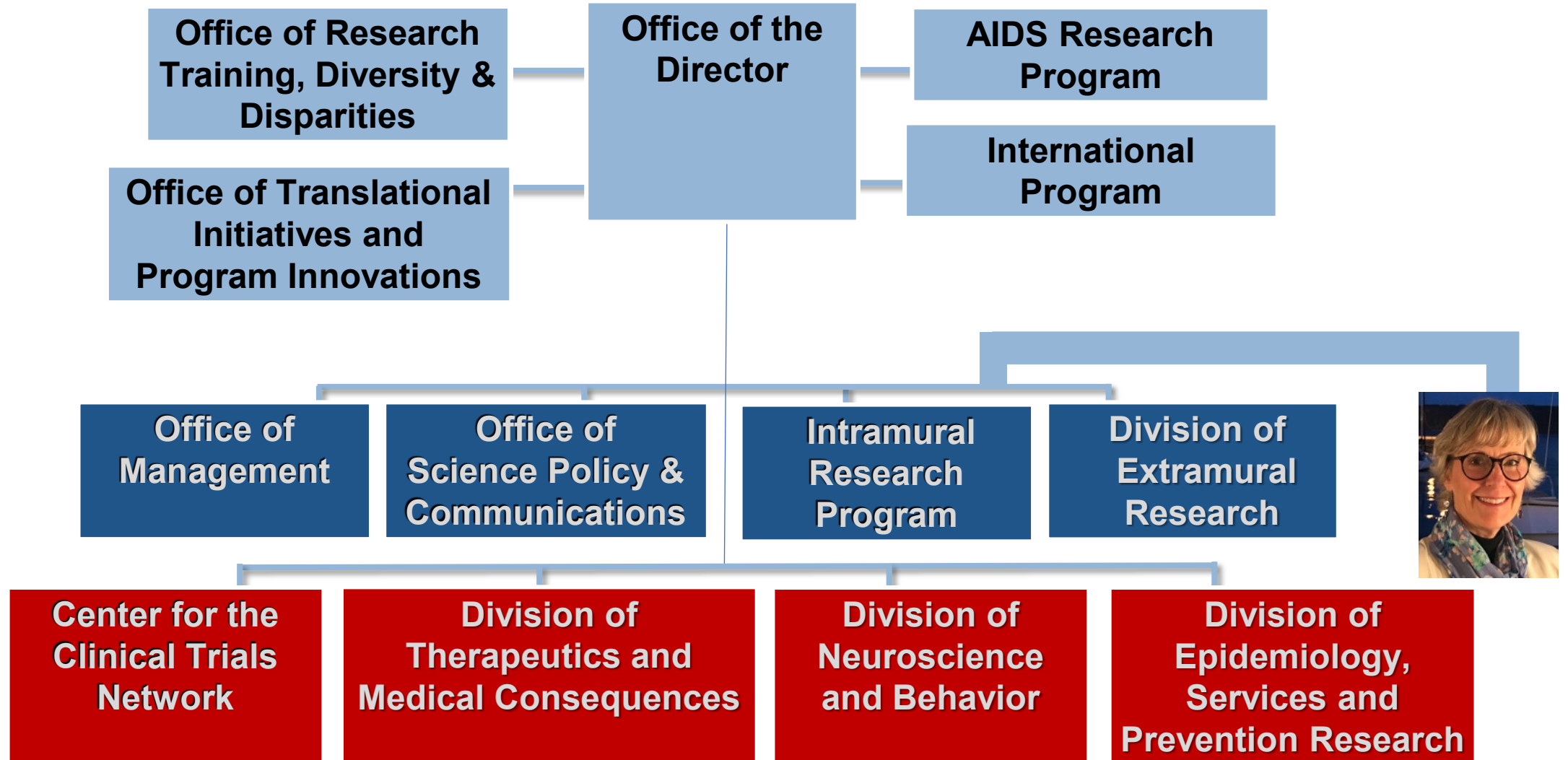
Director's Report to the
National Advisory Council on Drug Abuse

Nora D. Volkow, M.D.

Director

February 9, 2021

NIDA



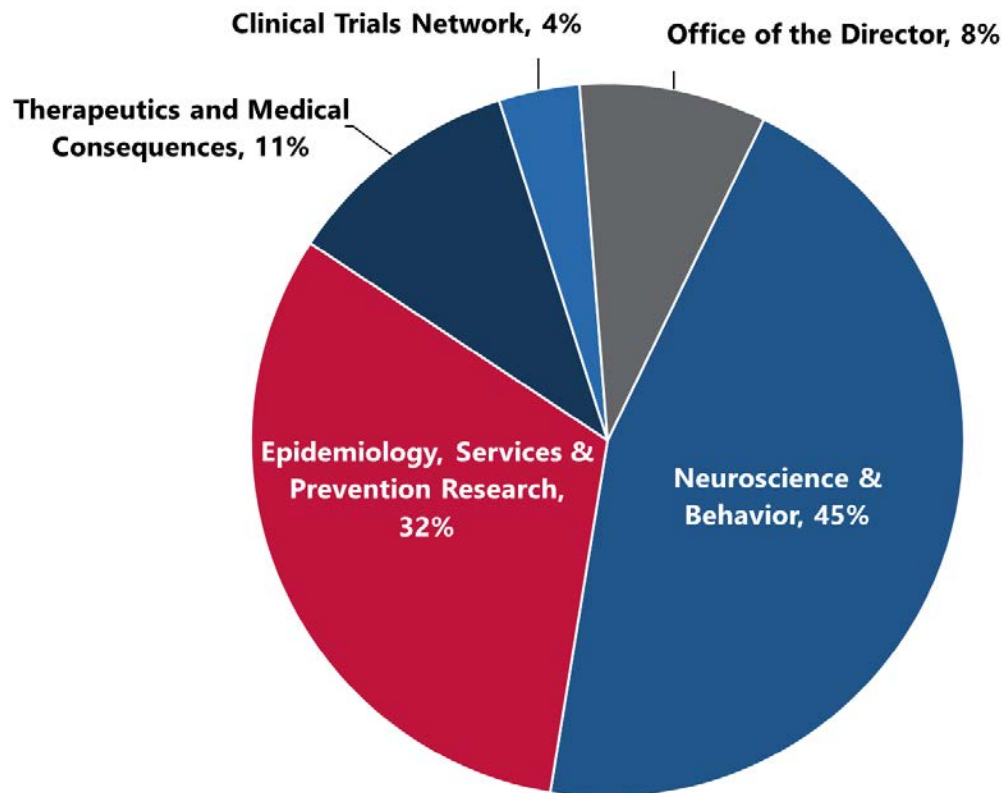
NIDA BUDGET

	FY 2020 (\$k)	FY 2021 (\$k)	FY 2022 PB (\$k)
Base	\$1,191,362	\$1,210,014	TBD
HEAL	\$266,321*	\$270,295*	
Total	\$1,457,683	\$1,480,309	

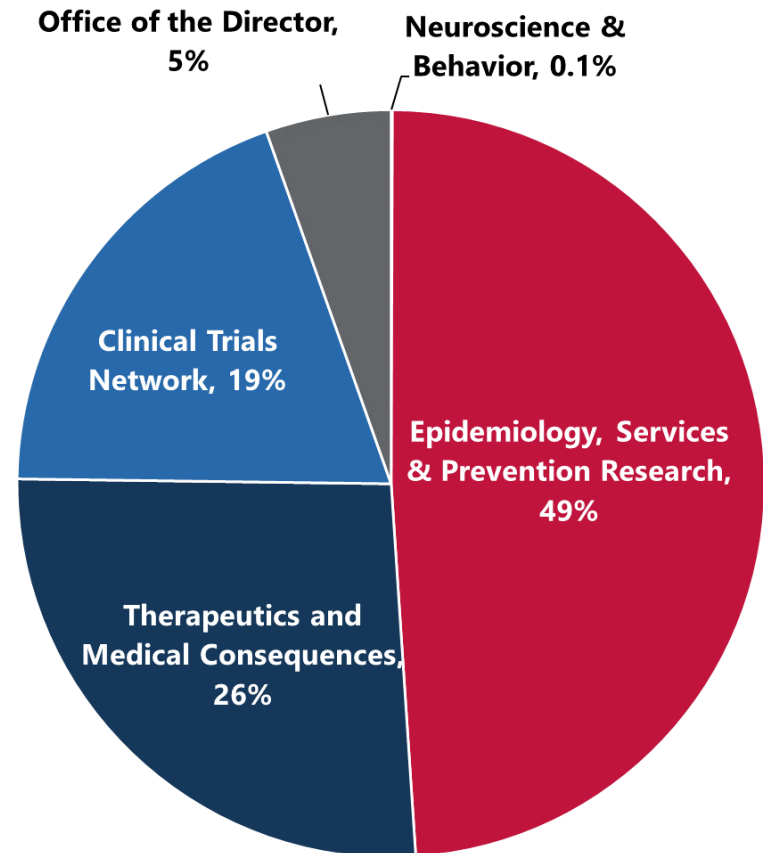
*NIH's total HEAL funding is split evenly between NIDA and NINDS

FY 20 Funding Overview

Non-HEAL Research



HEAL Research*



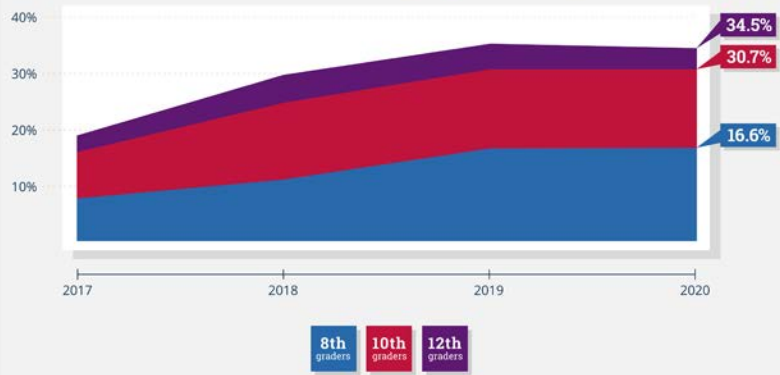
*Includes all NIDA HEAL projects regardless of funding source

Drug Use Trends Among U.S. Teens

Monitoring the Future 2020 Survey Results

Surge of Nicotine Vaping Levels Off, but Remains High

Past-Year Nicotine Vaping Held Steady



Daily or Near-Daily Nicotine Vaping



Past-Year JUUL Use Dropped Significantly Among Older Grades



2019 2020

Past-Year Marijuana Vaping Holds Steady

Past-Year Marijuana Vaping

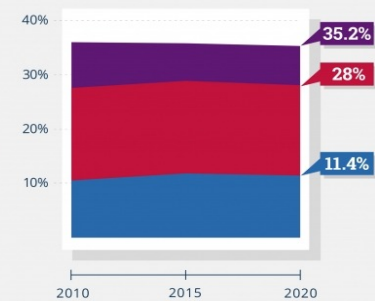


Daily or Near-Daily Marijuana Vaping Decreases Significantly Among 10th Graders

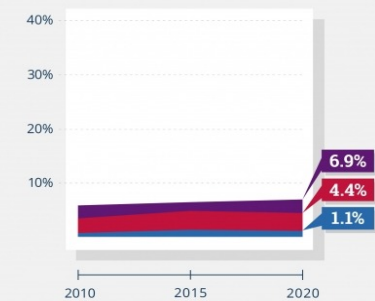


Marijuana Use Remains Steady

Past-Year Marijuana Use



Daily Marijuana Use



8th graders 10th graders 12th graders

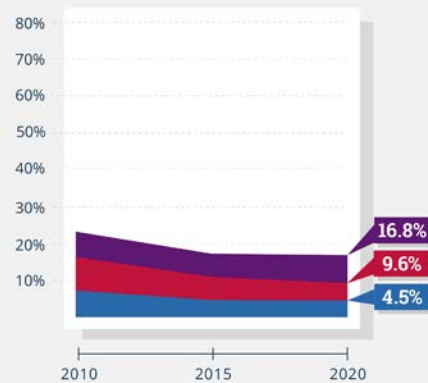
Drug Use Trends Among U.S. Teens

Monitoring the Future 2020 Survey Results

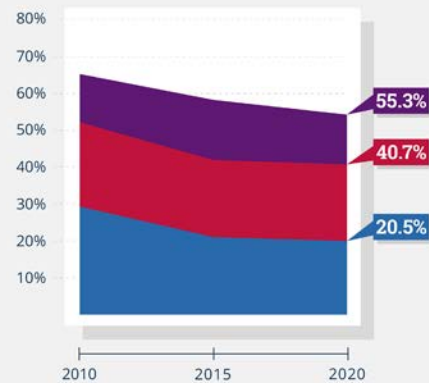
Gradual Decline in Alcohol Use Slows

Long-term trend of decreasing alcohol use among all grades levels off.

Binge Drinking*



Past-Year Alcohol Use

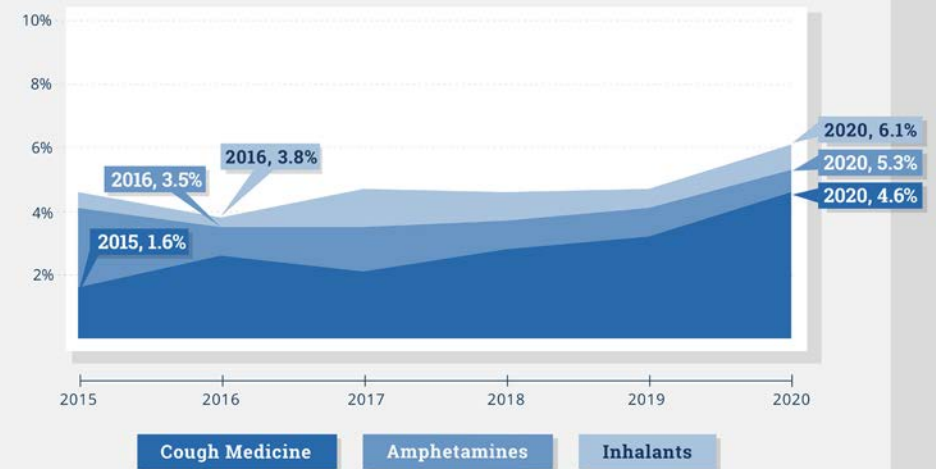


*5 or more drinks in a row in the past two weeks

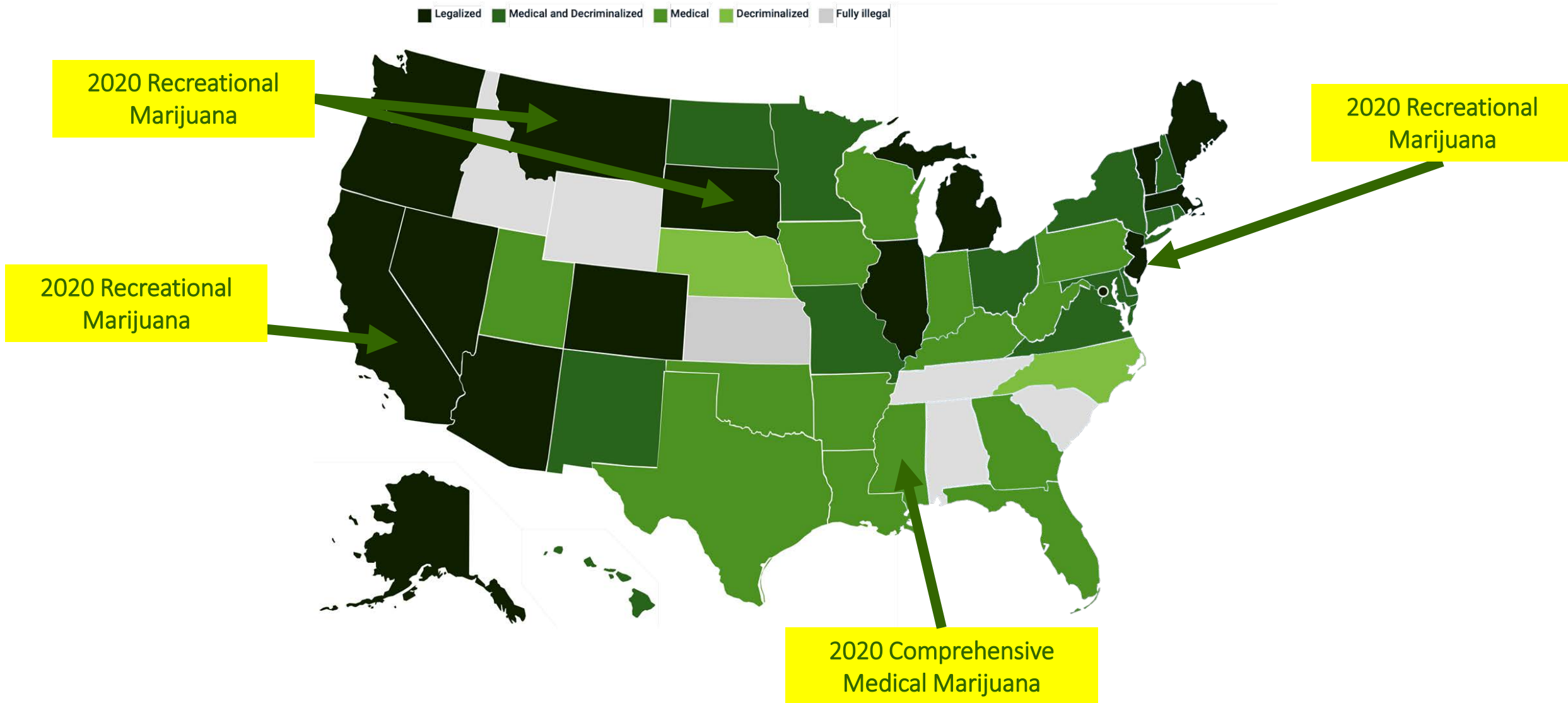


Amphetamine, Inhalant & Cough Medicine Misuse Trending Upward Among Eighth Graders

Past-Year Substance Misuse Among Eighth Graders

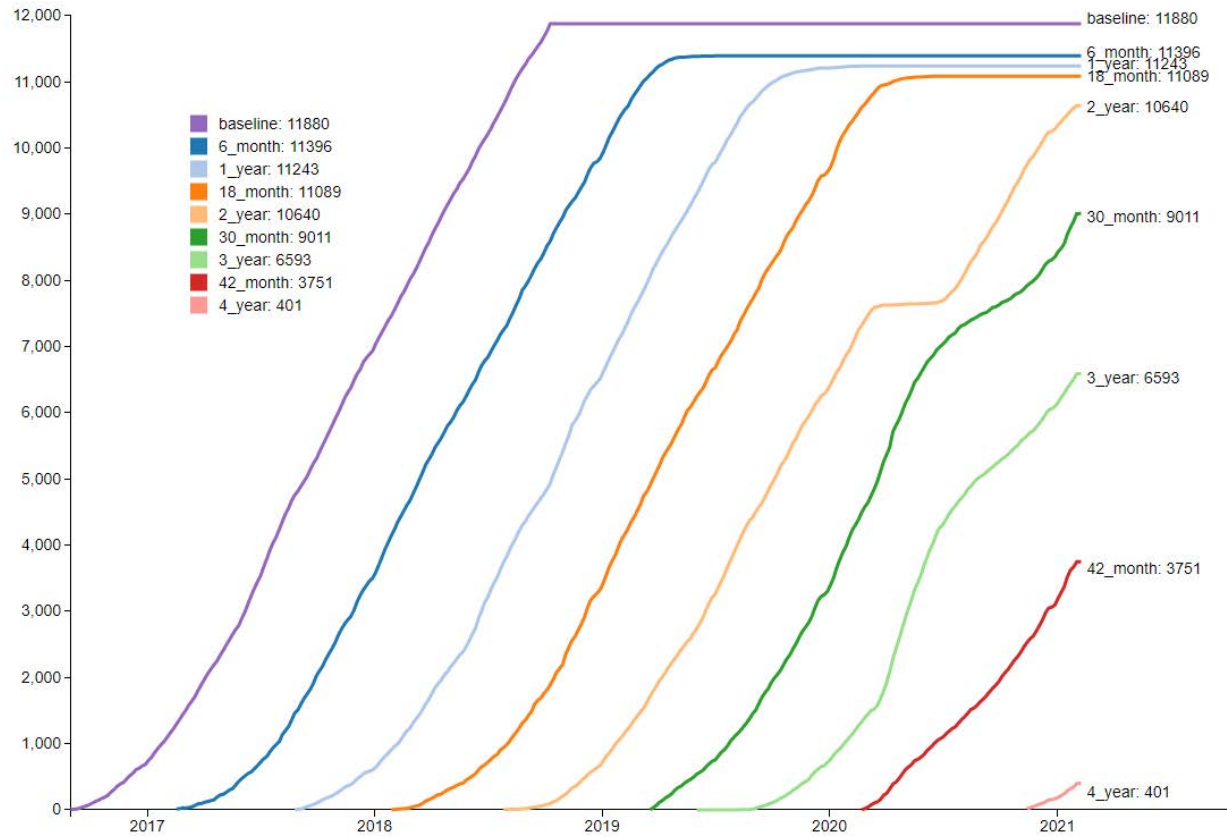


Legal Status of Cannabis Varies by State

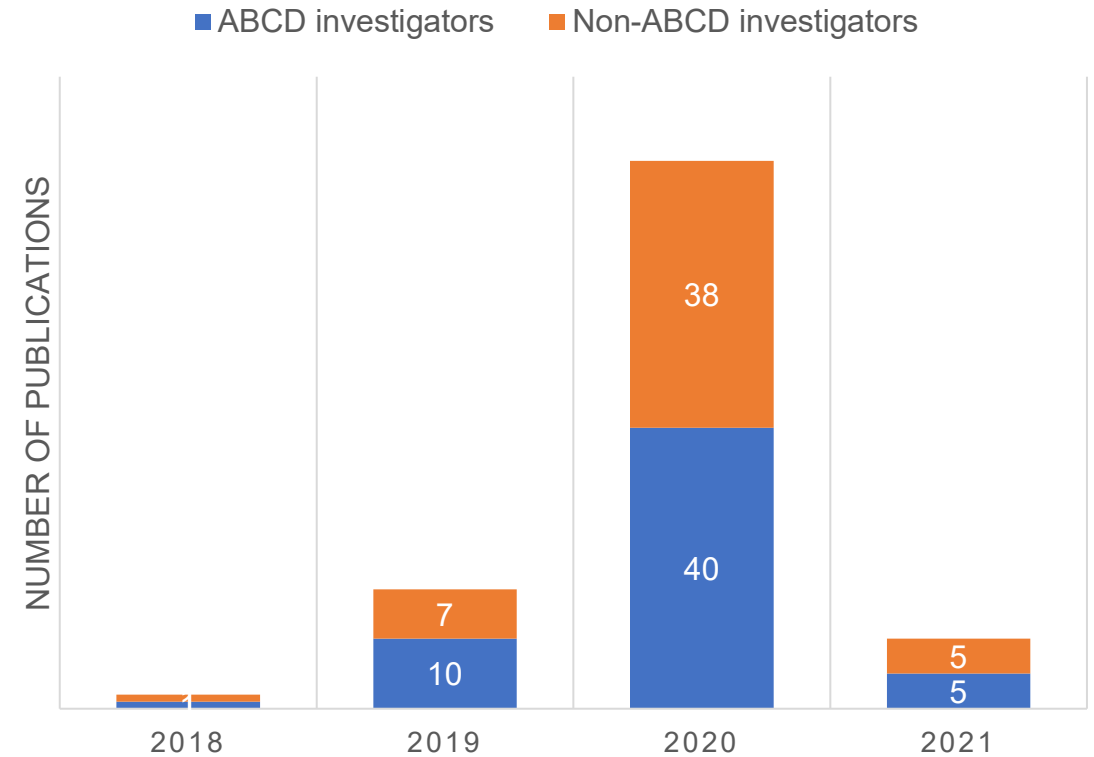


Adolescent Brain Cognitive Development Study

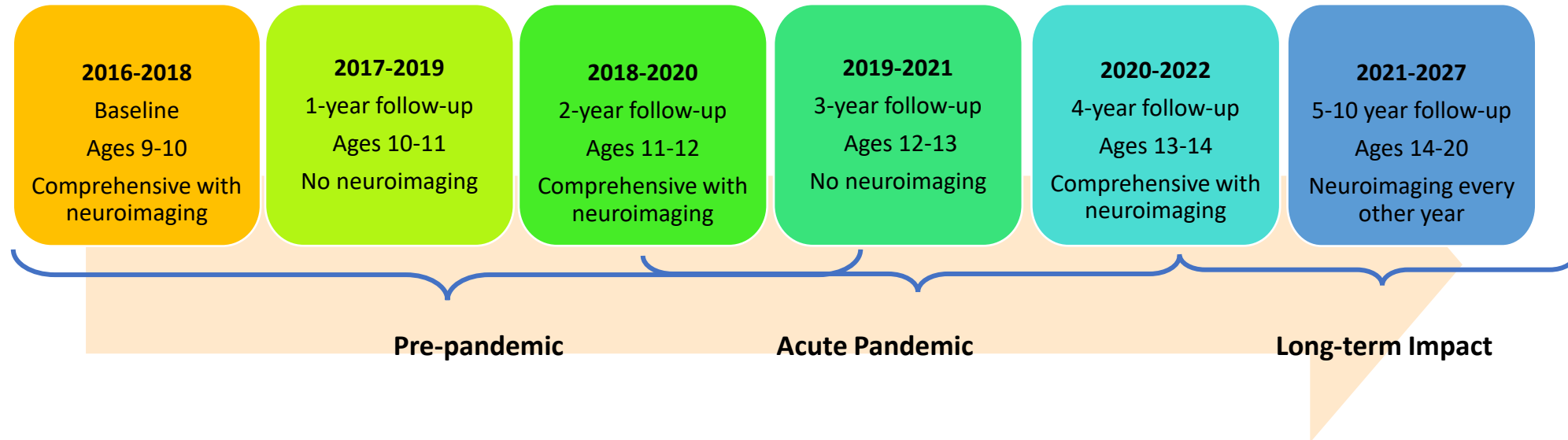
98.7 Percent Retained



PUBLICATIONS USING ABCD DATA



As of February 2021



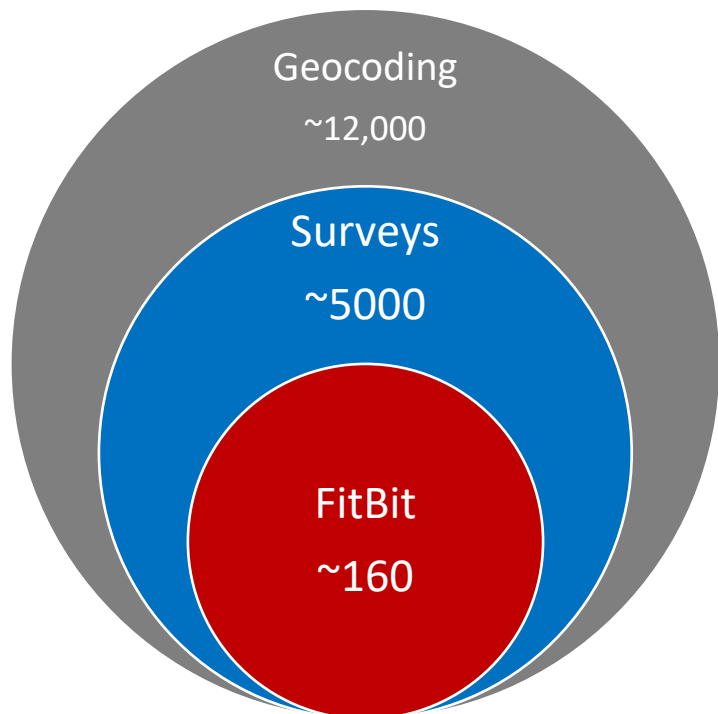
COVID-19 Adjustments

- Resumed 2-year follow-up visits (either virtually or hybrid)
 - In-person - brain imaging, select neurocognitive assessments and sensitive questionnaires
- No biospecimen collection
- 3-year follow-ups continuing virtually



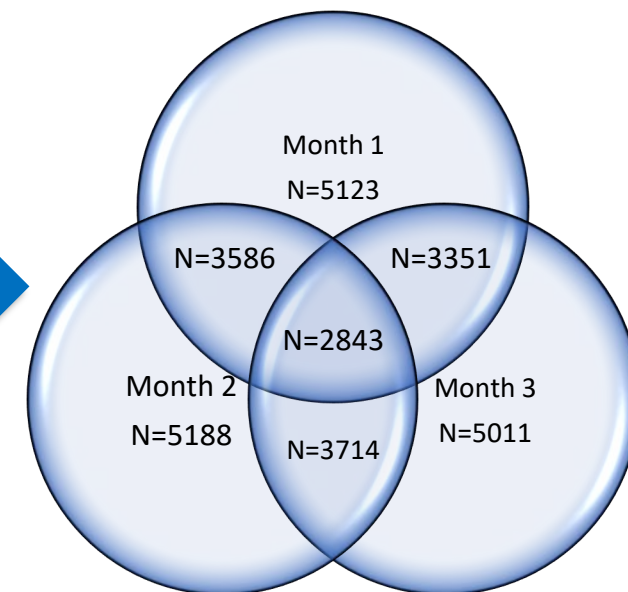
Adolescent Brain Cognitive Development Study: COVID-19 Supplements

Community level data (e.g., COVID prevalence, hospital resources/utilization, state/local policies, unemployment data, stimulus payment, social distancing)



Surveys (Youth and Caregiver) -

- May, June, August, October, December
- Surveys measure:
 - Family situation
 - Youth routines (school, activity, sleep, screen media)
 - Relationships
 - Attitudes/adherence to public health directives
 - Mental health, stress, substance use
 - Media/news exposure
 - COVID-19 status
- Data released from surveys 1-3: Dec 2020

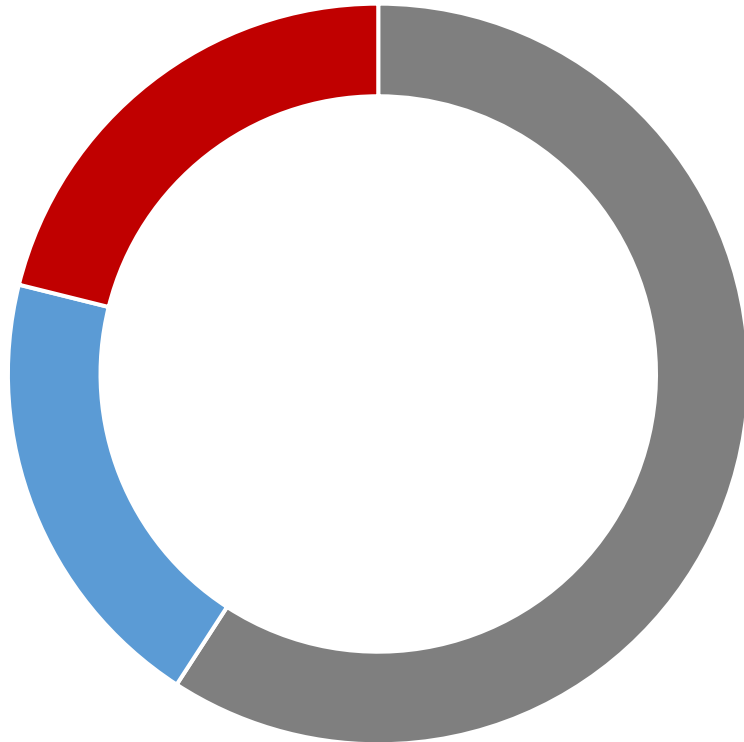


FitBit extension – Pre- and during pandemic data on activity, sleep, heartrate



HEALthy Brain and Child Development Study: COVID-19 Supplements

Approved/Awarded



COVID-19 Perinatal Experiences (COPE):
Longitudinal survey battery of parent & infant

- 2190 Untested Pregnant Women
- 473 COVID-19 Negative Pregnant Women
- 401 COVID-19 Positive Pregnant Women

Biospecimen Collection:

Virus & antibody panels, stress, epigenetics

- 340 Untested Pregnant Women
→ Saliva, Nasal Swab, Blood, Hair, Breastmilk
- 413 COVID-19 Negative Pregnant Women
- 341 COVID-19 Positive Pregnant Women
→ Blood, Hair, Breastmilk, Fecal Matter

Additional Assessments:

~ 275-1021 participants

- Substance Use, Anxiety, Depression, Stress
- Qualitative remote interviewing (n=50)
- Home language/environment analysis (n=226)
- MRI/EEG brain structure and function (n=121)



Schizophrenia and Influenza at the Centenary of the 1918-1919 Spanish Influenza Pandemic: Mechanisms of Psychosis Risk

Adrianna P. Kępińska¹, Conrad O. Iyegbe¹, Anthony C. Vernon^{2,3}, Robert Yolken⁴, Robin M. Murray¹ and Thomas A. Pollak^{1*}

¹Department of Psychosis Studies, Institute of Psychiatry, Psychology and Neuroscience, King's College London, London, United Kingdom

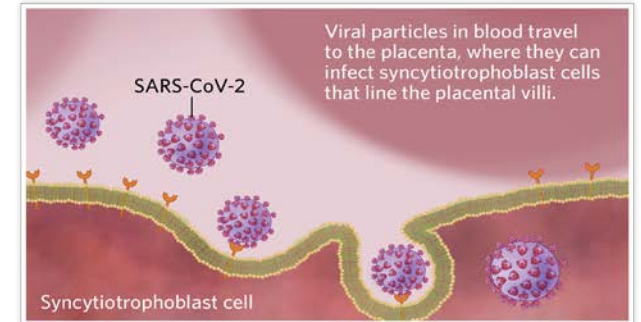
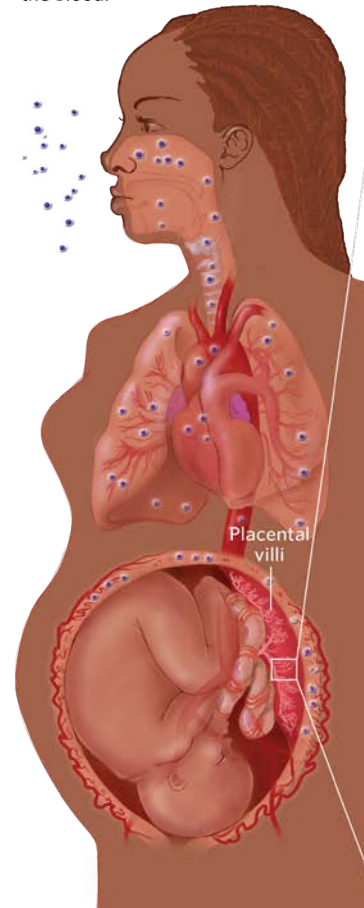
²Department of Basic and Clinical Neuroscience, Institute of Psychiatry, Psychology and Neuroscience, King's College London, London, United Kingdom

³MRC Centre for Neurodevelopmental Disorders, King's College London, London, United Kingdom

⁴Stanley Laboratory of Developmental Neurovirology, Johns Hopkins Medical Center, Baltimore, MD, United States

Associations between influenza infection and psychosis have been reported since the eighteenth century, with acute “psychoses of influenza” documented during multiple pandemics. In the late 20th century, reports of a season-of-birth effect in schizophrenia were supported by large-scale ecological and sero-epidemiological studies suggesting that maternal influenza infection increases the risk of psychosis in offspring. We examine the evidence for the association between influenza infection and schizophrenia risk, before reviewing possible mechanisms *via* which this risk may be conferred. Maternal immune activation models implicate placental dysfunction, disruption of cytokine networks, and subsequent microglial activation as potentially important pathogenic processes. More recent neuroimmunological advances focusing on neuronal autoimmunity following infection provide the basis for a model of infection-induced psychosis, potentially implicating autoimmunity to schizophrenia-relevant protein targets including the N-methyl-D-aspartate receptor. Finally, we outline areas for future research and relevant experimental approaches and consider whether the current evidence provides a basis for the rational development of strategies to prevent schizophrenia.

A pregnant mom inhales SARS-CoV-2, and on rare occasions, the virus enters the blood.

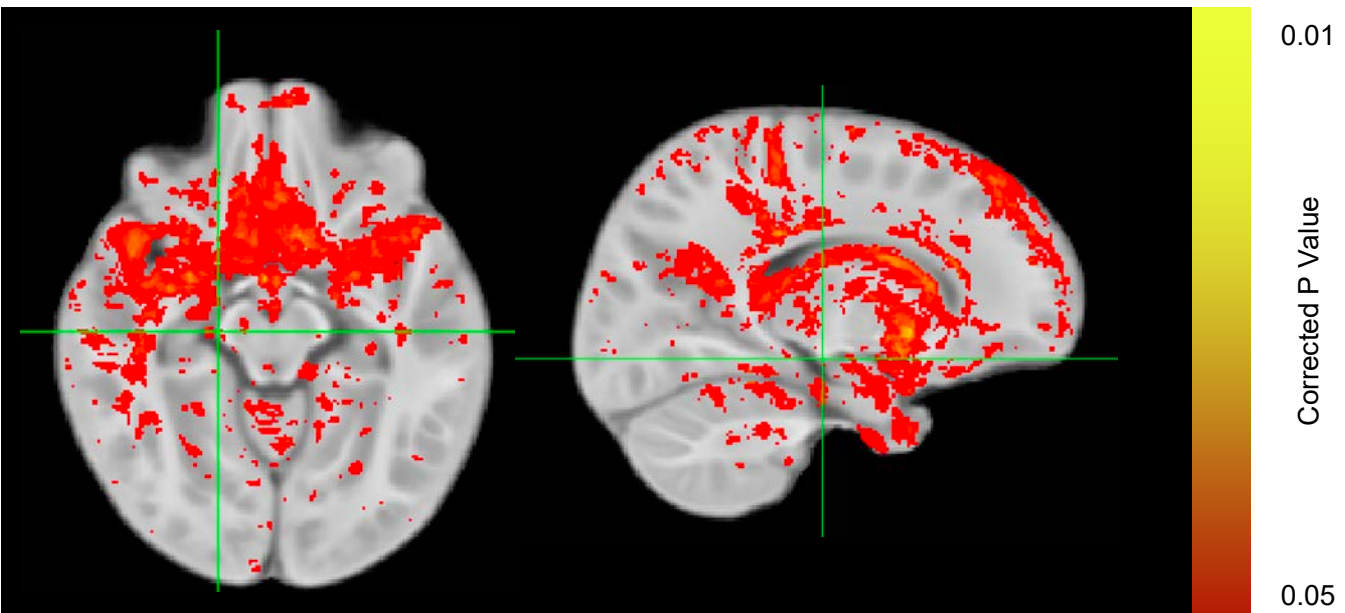


Delayed Myelination in Children born to COVID+ Mothers

		Pre 2019	COVID-19+
Gender	Male (n)	40	21
	Female (n)	25	17
Age Range (days)		86 - 102	88 - 112
Mean Gestation (days)		273 ± 15	281 ± 19
Birth Weight (g)		3342 ± 642	3311 ± 538
Birth Length (inches)		20 ± 3.6	21 ± 3.5
Maternal Education (Hollingshead Scale)		6 ± 1.3	5.7 ± 1.6
Paternal Education (Hollingshead Scale)		5.9 ± 1	5.4 ± 1.6
Family Size (# Children)		2.3 ± 1.1	2.3 ± 1.5

- Have not seen evidence of increased prematurity;
- Sample population highly skewed to Hispanic ethnicity;
- No serious illness (<1day hospital stay)
- Still investigating results in COVID- Mothers to understand environmental contributions to results.

Areas w/ Delayed Myelination at 3 Months of Age



Deoni et al unpublished



Among the most vulnerable to COVID-19 are people with compromised respiratory and cardiovascular systems



- **Tobacco Smoking**
- **Vaping**
(Nicotine and/or THC)
- **Opiate Use**
- **Psychostimulant use**
- **Cannabis**

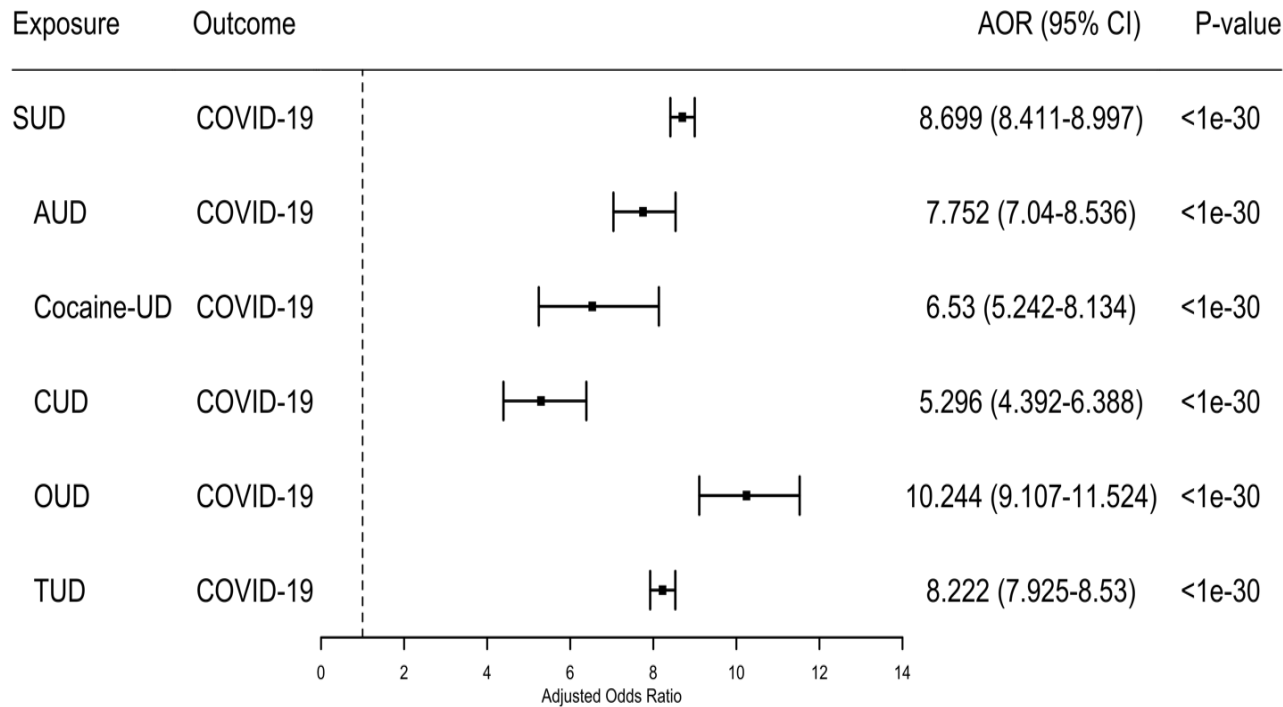
Structural Challenges for SUD During COVID-19

- **Access to OUD medications**
- **Limited access to peer-support groups**
- **Social distancing**
 - **increases risk of relapse**
 - **interferes with overdose reversal**
- **Homelessness**
- **Loss of jobs**
- **Stress**
- **STIGMA**

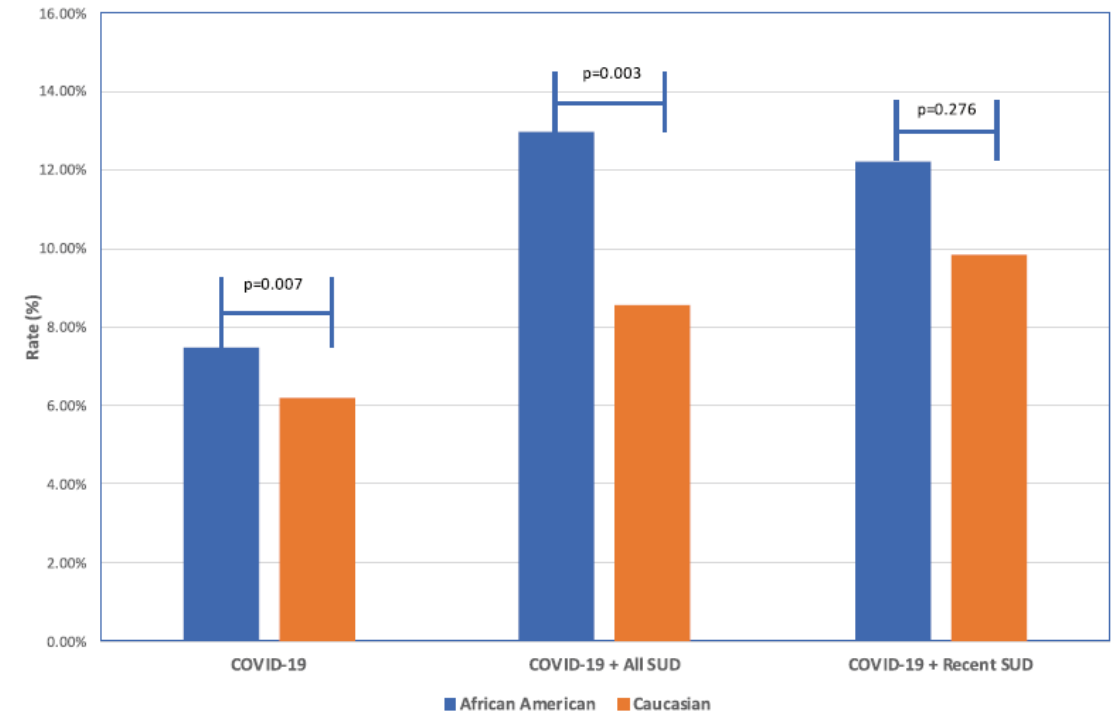
COVID-19 risk and outcomes in patients with substance use disorders: analyses from electronic health records in the United States

Quan Qiu Wang, David C Kaelber, Rong Xu, Nora D Volkow⁴ Wang et al., Mol Psychiatry 2020.

Risk associations between recent SUD diagnosis and COVID-19

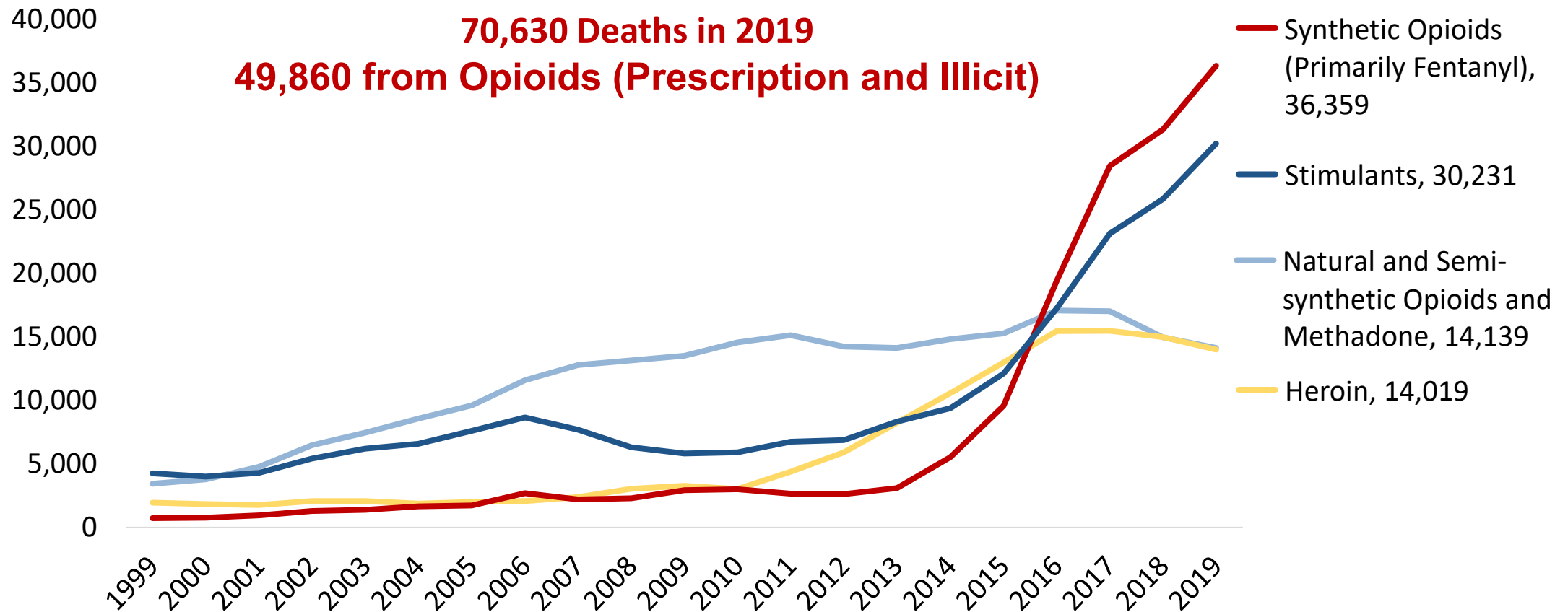


A Death rates among COVID-19 patients with SUD



Evolution of Drivers of Overdose Deaths, All Ages

Analgesics → Heroin → Fentanyl → Stimulants

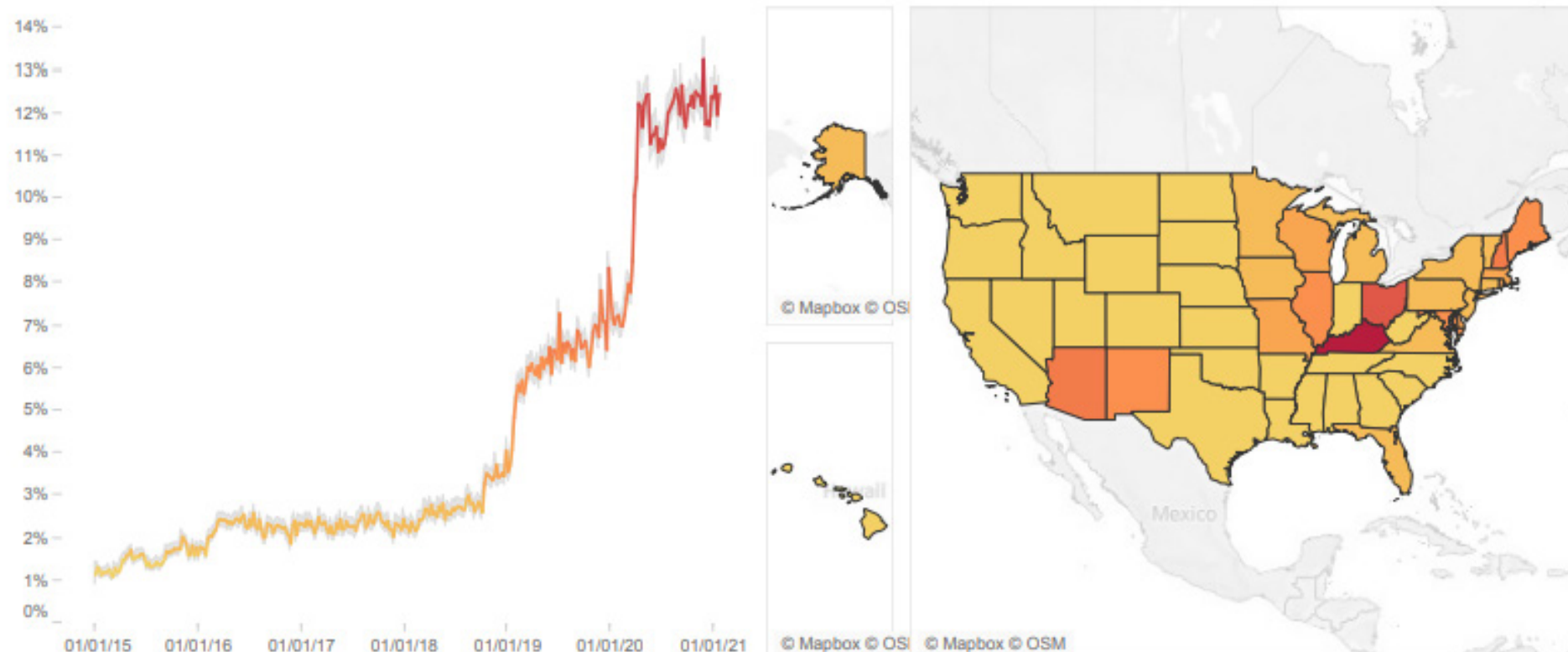


Source: The Multiple Cause of Death data are produced by the Division of Vital Statistics, National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention (CDC), United States Department of Health and Human Services (US DHHS).

Positive Urinalysis for Non-Prescribed Fentanyl Increased Sharply in Early 2020

Analysis of 6 Year Non-Prescribed Fentanyl Positivity

Insights below are based on specimens collected between 1/1/2015 and 1/23/2021



The graphs above display the positivity rate for non-prescribed fentanyl, where the total positivity rate is 4.2% [4.2% - 4.2%]. Gray bands show 95% confidence interval values. The legend shows the positivity rate color scale. States with less than 50 tests performed are not shown.



Increased Overdose Death Rates During COVID-19 Pandemic

12-months Ending June 2020 Compared to 12-months Ending June 2019

	ALL DRUGS	HEROIN	NAT & SEMI – SYNTHETIC	METHADONE	SYNTHETIC OPIOIDS	COCAINE	OTHER PSYCHO-STIMULANTS (mainly meth)
June-19	68,711	14,856	12,148	2,863	33,164	14,894	14,583
June-20	83,335	14,480	12,966	3,195	48,006	19,215	20,318
% Change	21.3%	-2.5%	6.7%	11.6%	44.8%	29.0%	39.3%

*Predicted Number of Deaths

Source: NCHS Provisional Drug Overdose Death Counts:

<https://www.cdc.gov/nchs/nvss/vsrr/drug-overdose-data.htm> (Accessed on 1-18-2021)

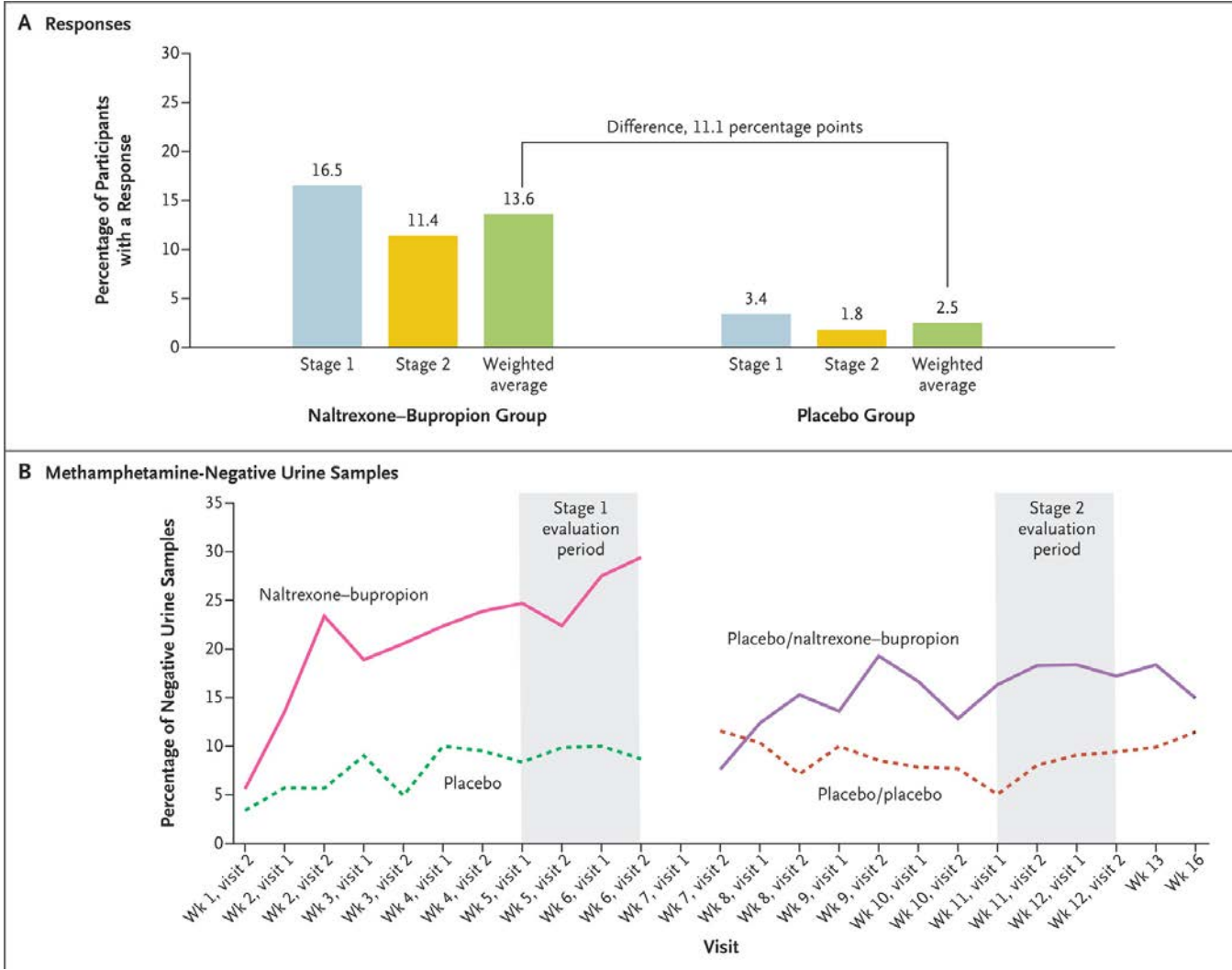
Fentanyl overdoses (OD) reversal with naloxone

- Deaths from fentanyl or analogs are increasing in spite of naloxone ([R Torralva and A Janowsky, 2019](#)).
- OD from fentanyl frequently require multiple naloxone administrations ([Schumann et al., 2007](#), [Somerville et al., 2017](#))
 - Shorter duration of naloxone ($t_{1/2}$ 1.3–2.4 h) than fentanyl ($t_{1/2}$ 7-8 h)
 - Slower clearance of fentanyl in frequent users
- Rapid injection of fentanyl can result in chest wall rigidity, which is not MOR mediated and might reflect noradrenergic and cholinergic effects.

MOUD for Fentanyl

- Limited data on methadone or buprenorphine or naltrexone on fentanyl associated OUD
- Methadone maintenance therapy (MMT) is effective in fentanyl OUD.
 - Retrospective study in RI showed that 6 months of MMT protected against death and promoted abstinence, but relapse rates were high ([Stone, et al., 2018](#)).
 - Repeated exposure to fentanyl common while in MMT, but no deaths for those who remained in treatment, 4 deaths in those who left treatment ([Stone, et al. 2020](#)).
- Buprenorphine is effective in fentanyl OUD ([Wakeman, et al., 2019](#)).
 - Harder to initiate patients on buprenorphine
- MOUD can reduce demand for fentanyl in rats ([Hammerslag, et al., 2020](#)).

Combination Treatment (Bupropion + Naltrexone) For Methamphetamine Use Disorder



Trivedi MH, et al. Trial of Bupropion and Naltrexone in Methamphetamine Use Disorder. New England Journal of Medicine. January 14, 2021.

Impact of COVID-19 on Researchers and Academic Institutions

NIH COVID-19 Extramural Research Survey: Objectives

Institutions

- What has been the impact of the pandemic on research activities at extramural institutions?
- What are the current and expected financial impacts to the institution, including on the research workforce?
- How are institutions currently planning for and prioritizing operations?

Individual Researchers

- What has been the impact of the pandemic on research productivity among individual researchers?
- How do researchers expect their career trajectory to be impacted by the pandemic?
- What external stressors are researchers experiencing?
- Are institutions providing effective support to researchers?

NIH COVID-19 Extramural Research Survey: Overview

Researchers Survey

Sample Selection	Domestic institutions: <ul style="list-style-type: none"> • eRA past two years • Are in a scientific role
Participants	45,348 out of 234,254 invites
Response Rate	19%
Timeline	October 14 – November 13, 2020

Institutions Survey

Sample Selection	Research leader (VP for Research or equivalent): <ul style="list-style-type: none"> • Top-funded 1,000 domestic institutions FY2019 • Members of the AAMC • Minority-serving institutions
Participants	224 out of 705 invites
Response Rate	32%
Timeline	October 7 – November 6, 2020

*Note: Missing data are excluded from the percentages shown throughout the analysis. Only percentages with more than 5 respondents are shown to protect privacy.

High-Level Findings – Extramural Institutions Survey

Concerned About ...

KEY QUESTIONS	Financial Status	Research Functions	Research Productivity	Loss in Endowment
All Respondents	66%	41%	83%	15%
Doctorate with Professional School (53%)	77%	49%	85%	19%
Doctorate without Professional School (17%)	74%	40%	82%	13%
Independent Research Institution (19%)	33%	29%	83%	-
Special Focus/Other Institution (7%)	-	-	87%	-
Minority-Serving Institution (24%)	77%	51%	74%	17%
Non-Minority Serving Institution (76%)	76%	44%	85%	15%

***Note:** For certain dependent variables, higher percentages correspond to a more negative impact; whereas for other dependent variables, higher percentages correspond to a less negative impact.

MSI = Minority Serving Institution, **NMSI** = Non-Minority Serving Institution

All percentages are out of valid totals, with missing values removed.

More negatively impacted than the average across all respondents
 Less negatively impacted than the average across all respondents
 On par with the average across all respondents

Researchers: Executive Summary



Career Trajectory

- ▶ Majority (55%) reported negative effect; 14% said not
- ▶ Laboratory-based (61%) most likely
- ▶ Strongest predictor ability to apply for grants
- ▶ Underrepresented groups (women, racial/ethnic groups) reported varying impact, with Asian scientists most negatively impacted; differences between groups moderated by type of work and career stage*



Mental Health

- ▶ Over 66% cited societal/political events and physical/social isolation
- ▶ Women and other gender identity affected more
- ▶ Early career investigators affected more



Research Productivity

- ▶ Most (78%) reported lower productivity
- ▶ Most early (80%) and mid-career investigators (81%) reported lower productivity
- ▶ Access to labs, facilities, and colleagues were strongest predictors of lower productivity

* See appendix and full deck; additional analyses forthcoming

NIDA Strategic Plan 2021-2025 Update

- **Drafting and design continue, based on input from NIDA staff and RFI**
 - Scientific content has largely been drafted by NIDA OSPC
 - Currently undergoing review and revision within NIDA
- **Overarching Goals**
 - Advance Our Understanding of Drug Use, Behavior and the Brain
 - Develop and Test Novel Prevention, Treatment, and Recovery Support Strategies
 - Study the Implementation of Evidence-Based Strategies in Real-World Settings
- **Areas of emphasis**
 - Multi-directional translation between basic, clinical, and implementation research
 - Putting patients and end users at the center of NIDA's mission
 - Using images and voices from NIDA research and NIDA stakeholders in the design
- **Upcoming Milestones**
 - A draft will be provided to Council members for feedback before the next meeting
 - Targeting release for the first half of 2021

Enhancing Health Disparities Research Related to Substance Use and Addiction: Research Gaps and Opportunities

February 16 (1pm ET):
SOCIAL DETERMINANTS OF HEALTH

February 17 (1pm ET):
HARNESSING BASIC SCIENCE TO UNDERSTAND RACIAL DISPARITIES AND THE IMPACT OF RACISM

To register: cdudevoir@leedmci.com

THANK YOU!