

Understanding the neurobiology of addiction in pregnancy

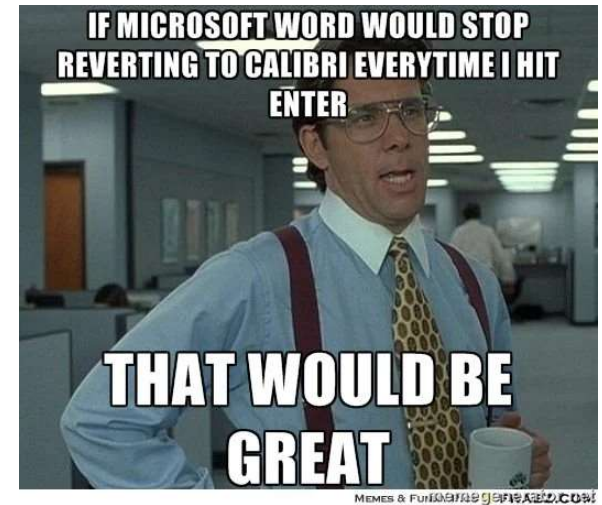


Marcela Smid, MD MA MS
Maternal Fetal Medicine
Addiction Medicine



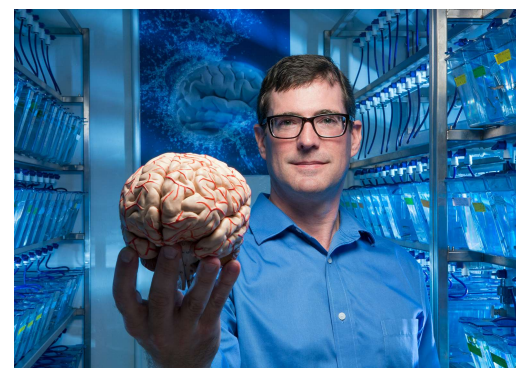
DISCLOSURES

- Research funds from Gilead Science Inc. for hepatitis C treatment for pregnant and postpartum women
- Research funds from Alydia Health/Organon for JADA, intrauterine vacuum induced hemorrhage control device
- NIDA R21 DA053463-01 RCT of micronized progesterone for prevention of return to methamphetamine use among postpartum individuals



DISCLOSURES

- I am not neuroscientist.



Who is this person and
why is she here?



M SMID'S PATH TO PERINATAL ADDICTION IN ONE SLIDE

- CWRU
 - Medical anthropology (of birth)
- UB Berkeley and
 - MS (pregnancy and youth)
 - Year in Mexico (midwives)
- OB-GYN resident
- UNC – fellowship
 - Focused on
 - Got an X wa
- University of Utah
- SUPeRAD Clinic
 - Multi-disc
 - VPCAT and W
 - Addiction medicine boards clinical pathway
- So not a neurobiologist...



LEARNING OBJECTIVES

- Understand addiction 101 (maybe 102)
- Neurobiology of addiction, pregnancy and pregnancy & addiction
- Describe how the trajectory of substance use and substance use disorders intersects with pregnancy and postpartum period **including increased risk of death**
- Describe some evidence-informed treatments for substance use disorders among pregnant and postpartum people

Addiction, substance use disorder and your brain



DEFINITIONS

Substance Use – Sporadic consumption (generally) without adverse consequences



Misuse – Excessive use of psychoactive substances, such as alcohol, pain medications, or illegal drugs potentially leading to physical, social, or emotional harm

- Emerging term of **pre-addiction**



DEFINITIONS

Tolerance - physiologic adaptation & diminished response to substance after repeated uses

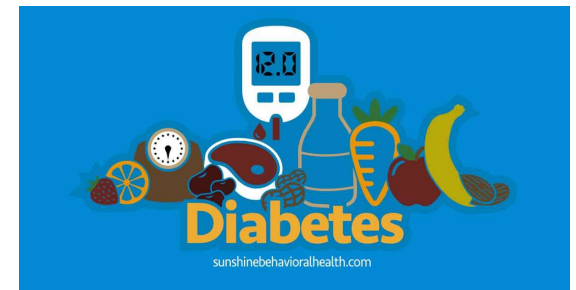
Physical Dependence – State of adaptation manifested by a class-specific withdrawal syndrome produced by abrupt cessation or rapid dose reduction of the substance, or by administration of an antagonist

Psychological Dependence – Subjective sense of a need for a specific psychoactive substance, either for its positive effects or to avoid negative effects associated with its abstinence

ADDICTION

- A primary, chronic disease of **brain** of the 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.
- 50% of addiction is hereditary/familial

Addiction is not a moral failing. It is a chronic disease that requires medical and professional help.



DICTION OF ADDICTION

- Change your addiction to person centered language in medical practice
- People who decide how to label themselves

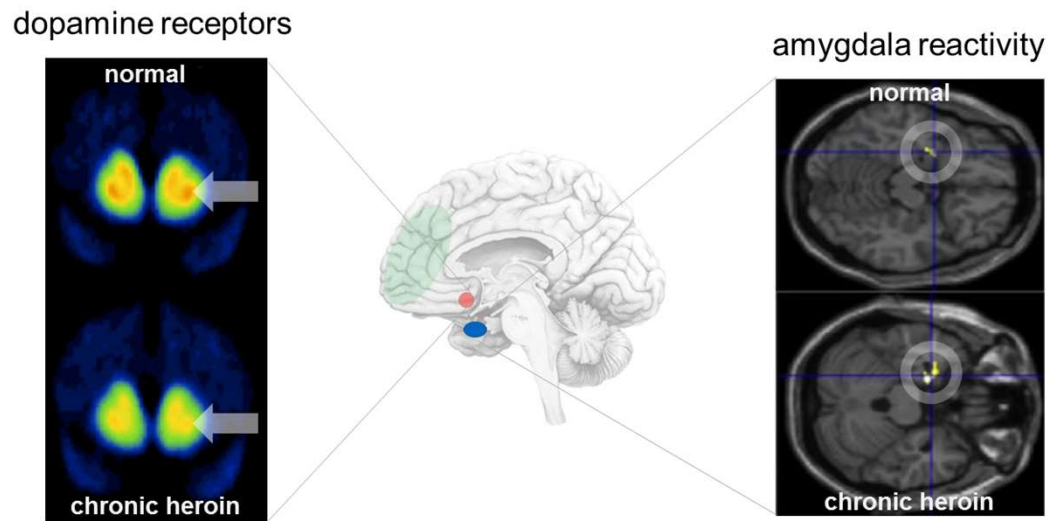


BEST PRACTICES TO AVOID USING STIGMATIZING LANGUAGE

Don't Use	Do Use	Why
<p>"addict"</p> <p>"abuser"</p> <p>"junkie"</p>	<p>"person who uses heroin"</p> <p>"person with cocaine use disorder"</p>	<p>Using "person-first" language demonstrates that you value the person, and are not defining them by their drug use.</p>
<p>"got clean"</p>	<p>"no longer uses drugs"</p>	<p>"Clean," although a positive word, implies that when someone is using they are "dirty."</p>
<p>"addicted newborn"</p> <p>"born addicted"</p> <p>"crack baby"</p>	<p>"newborn opioid withdrawal (NOW)"</p> <p>"baby with prenatal cocaine exposure"</p>	<p>Infants are not addicted; they have prenatal substance exposure and/or physiological dependence.</p>
<p>"medication replacement therapy (MRT)"</p> <p>"medication assisted therapy (MAT)"</p>	<p>"opioid agonist therapy (OAT)"</p> <p>"medication for opioid use disorder (MOUD)"</p> <p>"medication for alcohol use disorder"</p>	<p>These categories are value-neutral and precise.</p> <p>When discussing a specific medication, refer to it by both its generic and brand names.</p>

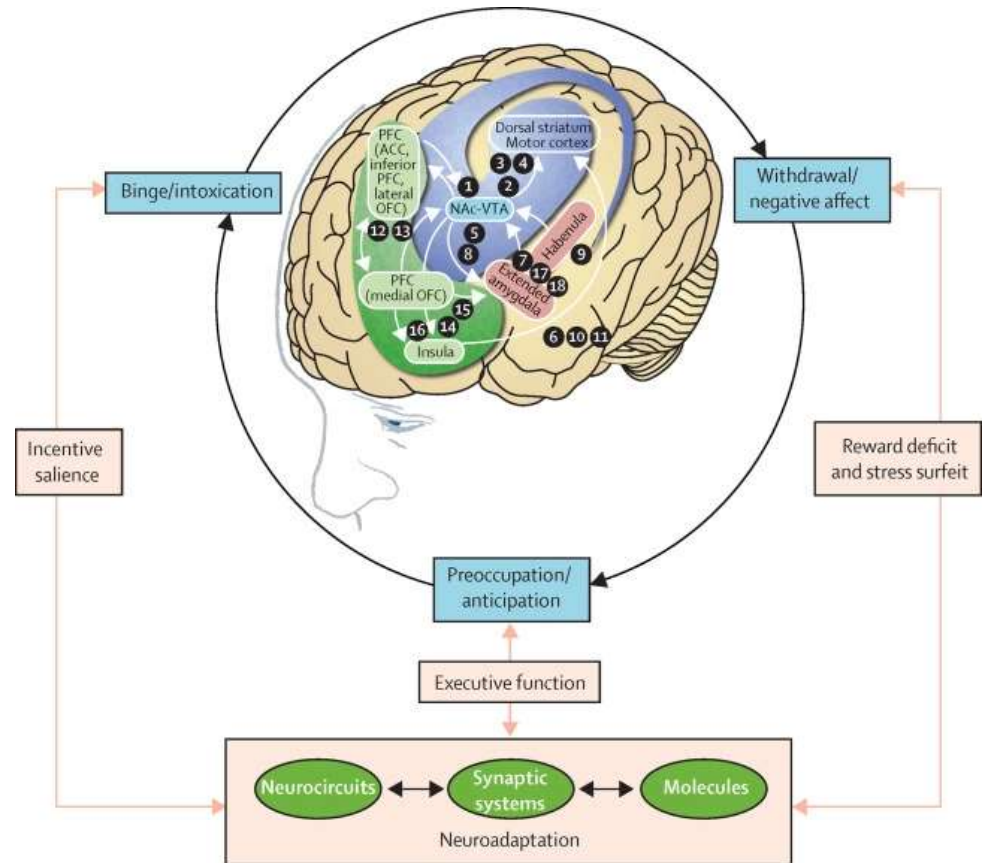
NOT NANCY REAGAN'S BRAIN

- People with addiction who use substance are often motivated less by feeling good and more about not feeling bad.



NEUROBIOLOGY OF ADDICTION

- **Reward-reinforcement**
 - Nucleus accumbens and ventral tegmentum
 - Dopamine and oxytocin
 - Diminished effect
- **Salience and fear**
 - Amygdala
 - Avoid feeling bad
- **Executive functioning**
 - Ventrolateral prefrontal cortex
 - Preoccupation



REVIEW | VOLUME 3, ISSUE 8, P760-773, AUGUST 2016

Neurobiology of addiction: a neurocircuitry analysis

Dr George F. Koob, PhD | Nora D Volkow, MD

SUBSTANCE USE DISORDER

Loss of control

- more than intended
 - amount used
 - time spent
- unable to cut down
- giving up activities
- craving

Physiology

- tolerance
- withdrawal

Consequences

- unfulfilled obligations
 - work
 - school
 - home
- interpersonal problems
- dangerous situations
- medical problems

formerly "dependence"

formerly "abuse"

- A **substance use disorder** is defined by having 2 or more • in the past year resulting in distress or impairment.
- **Tolerance** and **withdrawal** alone don't necessarily imply a disorder.
- Severity is rated by the number of symptoms present:

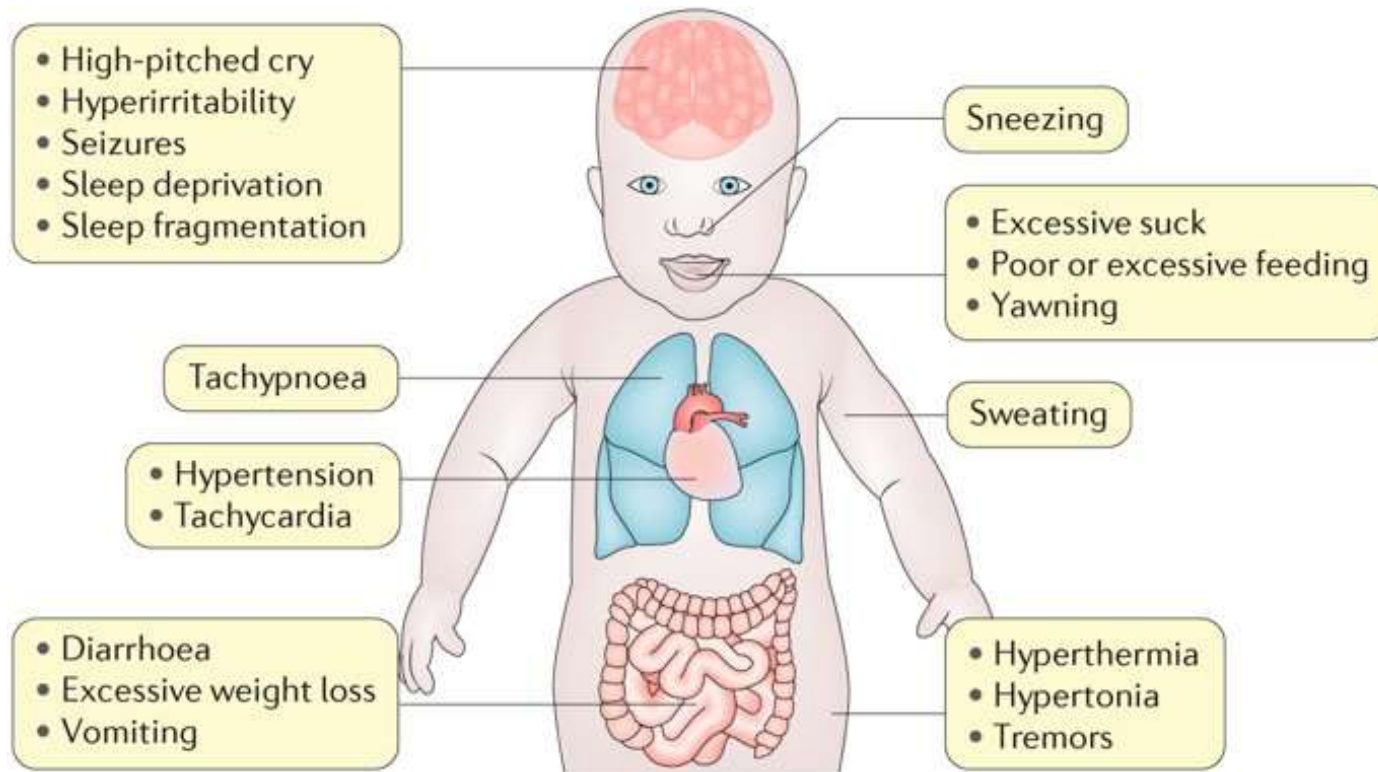
2-3 = mild
4-5 = moderate
6+ = severe

INFANTS CANNOT HAVE AN ADDICTION



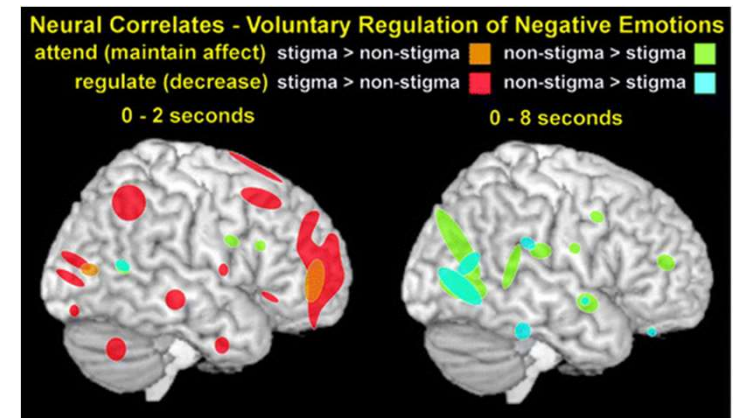
sky NEWS Special Report

NEONATAL ABSTINENCE SYNDROME (NAS)/ NEONATAL OPIOID WITHDRAWAL SYNDROME (NOWS)



STIGMA AND DISCRIMINATION

- Stigma is a process that discriminates against people who use drugs (especially pregnant and parenting people)
- **Pushes them to the margins**
- **Individual:** using word “addict” or “junkie”
- **Institutional:** firing people for positive drug screen
- **Stigma through association:** “do we really want those people in our office?”
- **Internalized stigma:** believing you deserve pain or suffering because you used drugs
- Evidence from fMRI that people exposed to stigma have brain changes



Windows to the Brain

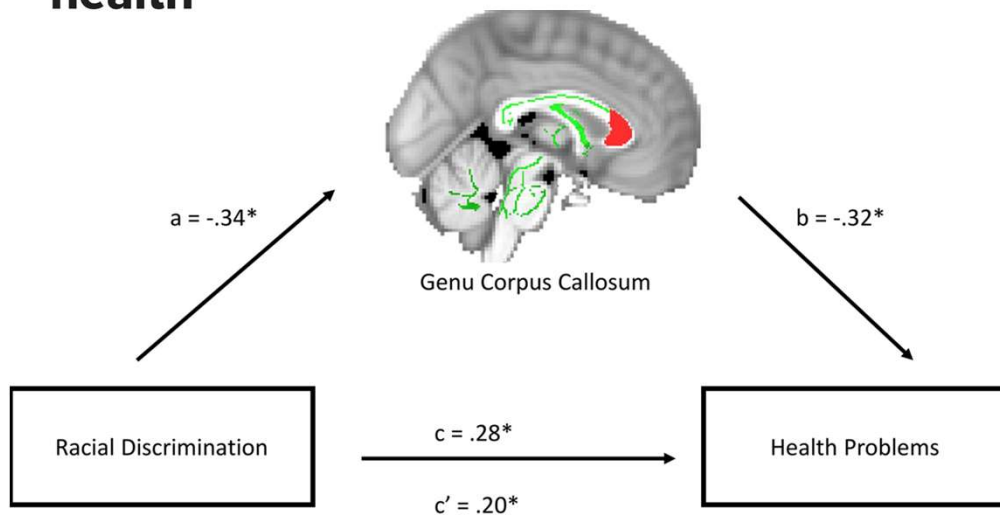
Neurobiology of Implicit and Explicit Bias: Implications for Clinicians

Kristina M. Reihl, Ph.D., Robin A. Hurley, M.D., Katherine H. Taber, Ph.D.

Published Online: 21 Oct 2015 | <https://doi.org/10.1176/appi.neuropsych.15080212>

RACISM AND CLASSISM IN PERINATAL ADDICTION

Exposure to racism linked to brain changes that may affect health



Archival Report

Indirect Effects of Racial Discrimination on Health Outcomes Through Prefrontal Cortical White Matter Integrity

[Onyebuchi Okeke^a](#), [Aziz Elbasheir^a](#), [Sierra E. Carter^b](#), [Abigail Powers^a](#), [Yara Mekawi^d](#),
[Charles F. Gillespie^a](#), [Ann C. Schwartz^a](#), [Bekh Bradley^a](#), [Negar Fani^a](#)



CONTENTS: CURRENT COMMENTARY

Redefining Child Protection

Addressing the Harms of Structural Racism and Punitive Approaches for Birthing People, Dyads, and Families Affected by Substance Use

Wakeman, Sarah E. MD; Bryant, Allison MD, MPH; Harrison, Nzinga MD

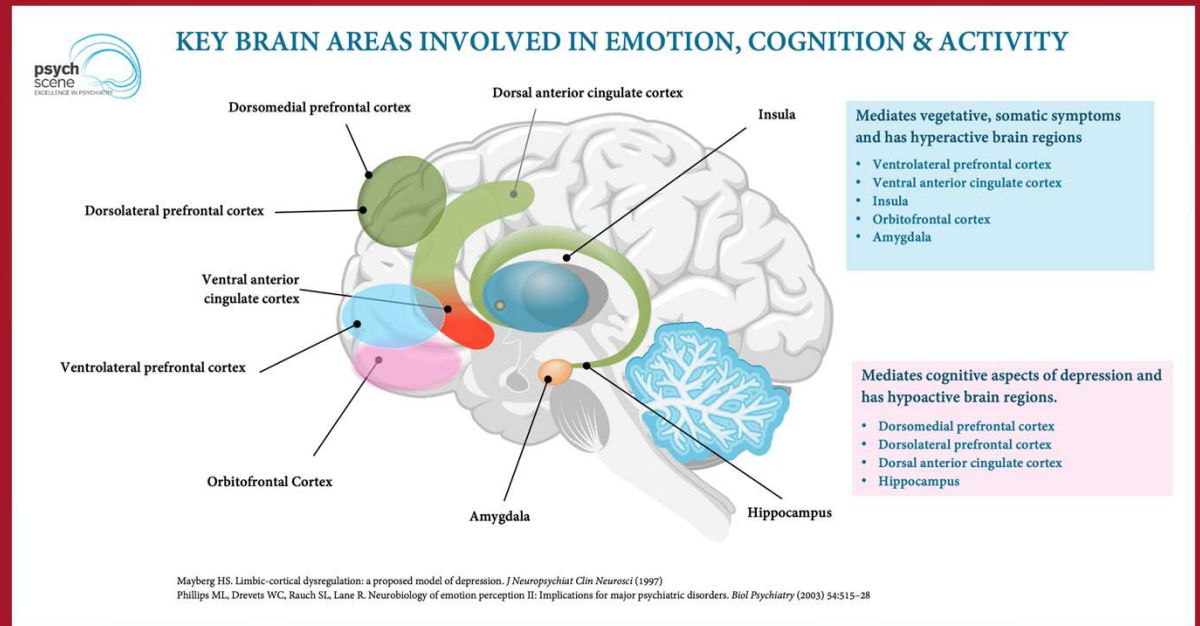
Author information

Obstetrics & Gynecology 140(2):p 167-173, August, 2022. | DOI: 10.1097/AOG.00000000000004786



CONFIDENTIAL

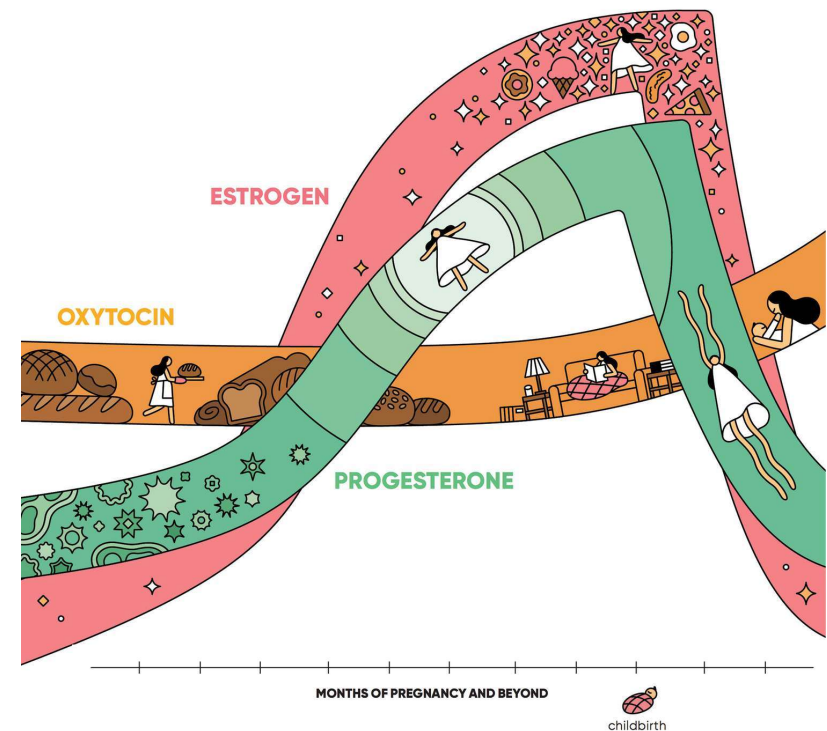
Neurobiology of pregnancy



HORMONAL AND INFLAMMATORY CHANGES



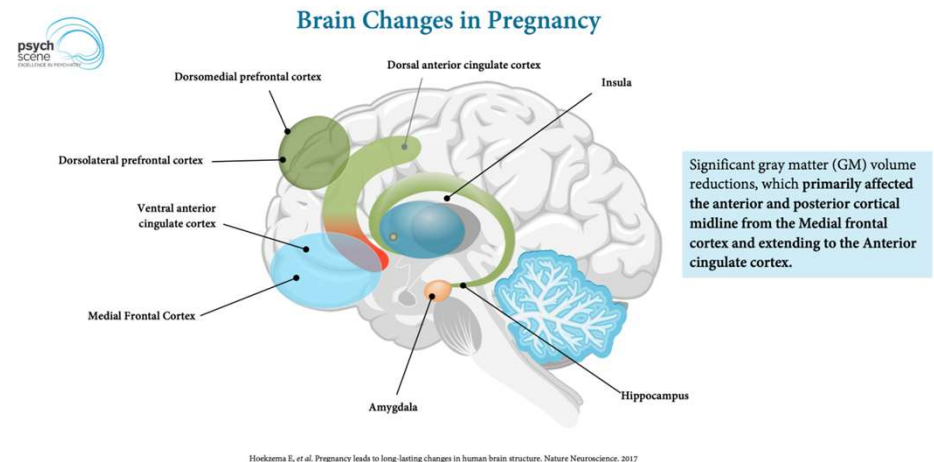
- **Hormones:** Estrogen, Progesterone, Testosterone, Cortisol, Dopamine, Oxytocin
- Changes in the brain areas associated with emotional regulation
 - Amygdala
 - Prefrontal cortex
 - Orbitofrontal cortex
- **Inflammation**
 - Amygdala activation to threatening images in pregnant brain
- **Sleep (deprivation)**
 - 80 hours of lost sleep in first infant's year of life
 - Gray matter volume and functional connectivity at rest



NEUROBIOLOGY OF PREGNANCY

- Functional MRI studies of peripartum people
 - **Gray matter reduction**
 - No changes in white matter
- Initial reduction in hippocampus
 - That partially recovered after 2 years
 - Pregnancy brain
- Similar to changes in female adolescents with synaptic pruning and improves neuronal connection

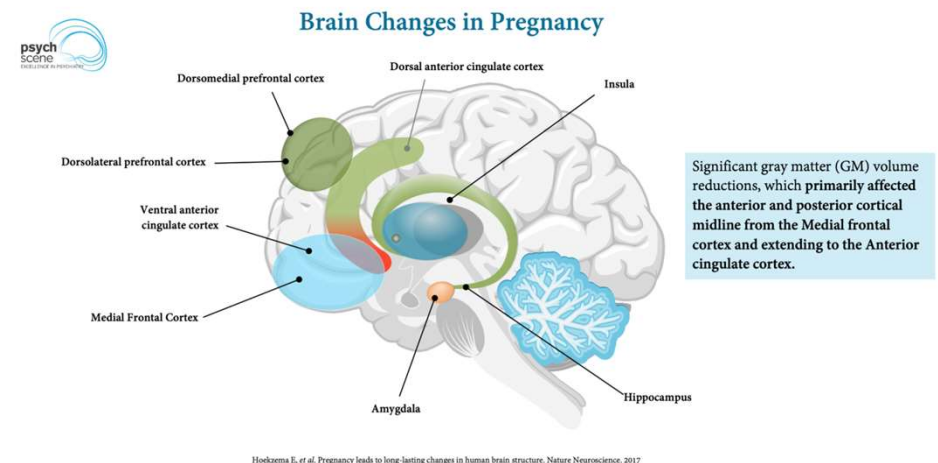
The Amazing Brain Changes in Pregnancy Linked to Mother-Infant Attachment



NEUROBIOLOGY OF PREGNANCY

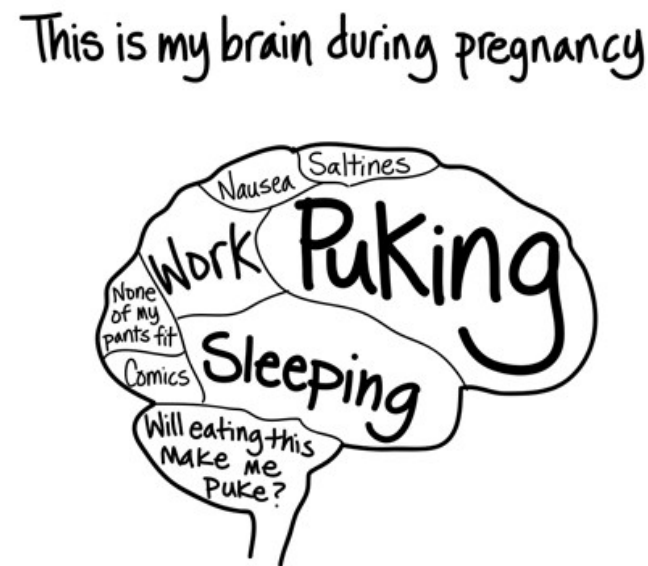
- **Reward-reinforcement**
 - Nucleus accumbens and ventral tegmentum
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- **Salience and fear**
 - Amygdala
- **Executive functioning**
 - Ventrolateral prefrontal cortex
- **Social recognition**
 - Medial and lateral PFC
 - Facial cues
 - Particularly of own child

The Amazing Brain Changes in Pregnancy Linked to Mother-Infant Attachment



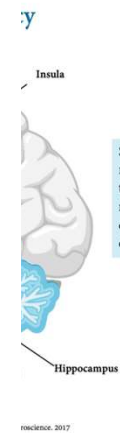
NEUROBIOLOGY OF PREGNANCY

- **Psychosocial stress** (finances, intimate p decrease hippocan
- **Caregiver** have mor than those
 - Non-bi adopti chang of the pregnant individuals



The Amazing Brain Changes in Pregnancy

Attachment



Significant gray matter (GM) volume reductions, which primarily affected the anterior and posterior cortical midline from the Medial frontal cortex and extending to the Anterior cingulate cortex.

of pregnancy on resting state brain activity, white matter microstructure, neural metabolite concentrations and grey matter architecture

Elseline Hoekzema, Henk van Steenbergen, Milou Straathof, Arlette Beekmans, Inga Marie Freund, Petra J. W. Pouwels & Eveline A. Crone

Nature Communications 13, Article number: 6931 (2022) | Cite this article

Hoe

Pregnancy and addiction neurobiology (well sort of)



SUBSTANCE USE IN PREGNANCY

- **Vast majority (80%)** pregnant women will achieve abstinence from substances by the end of second trimester
- Most frequently with no medical intervention

Perinatal Substance Use: A Prospective Evaluation of Abstinence and Relapse

Ariadna Forray¹, Brian Merry¹, Haiqun Lin², Jennifer Prah Ruger³, and Kimberly A. Yonkers^{1,2,4}

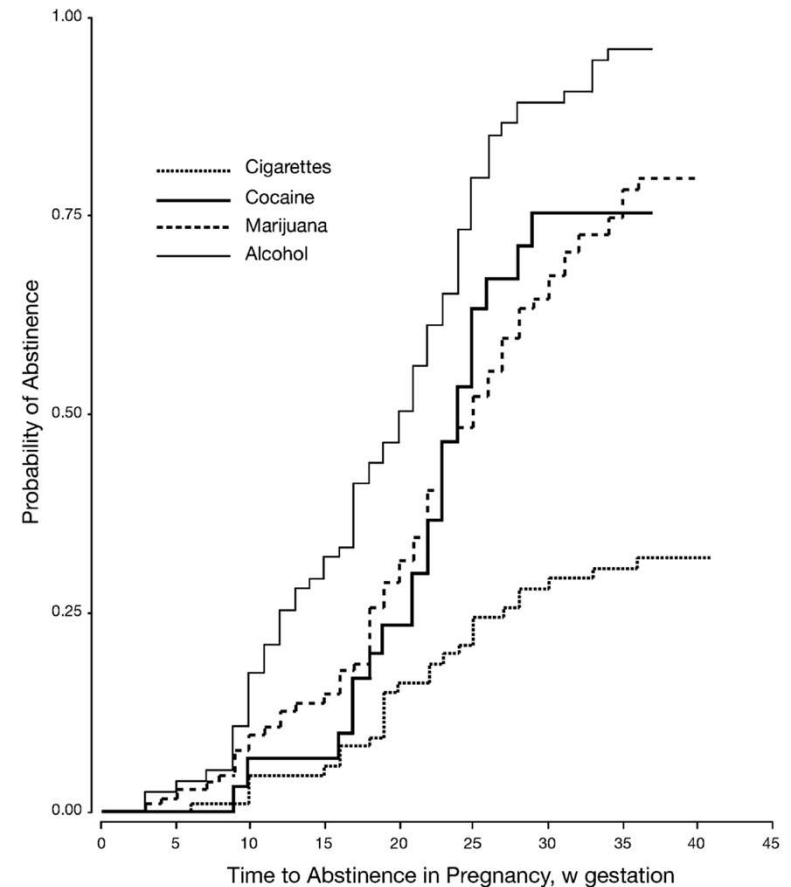


Figure 2. Time to Abstinence in Pregnancy by Drug
Kaplan-Meier estimates of the time interval in pregnancy (weeks in pregnancy) to abstinence from cigarettes, alcohol, marijuana or cocaine.

RETURN TO USE

- 80% of postpartum individuals who were abstinent in last month of pregnancy, returned to using at least one substance with year postpartum.

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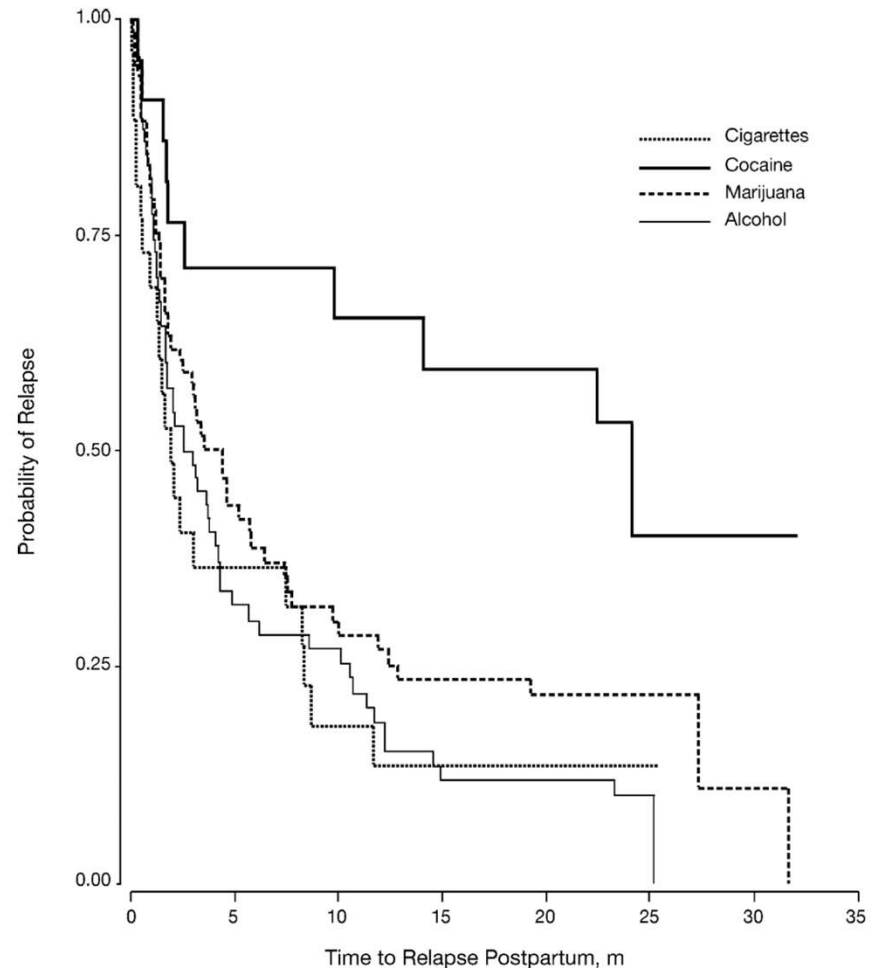
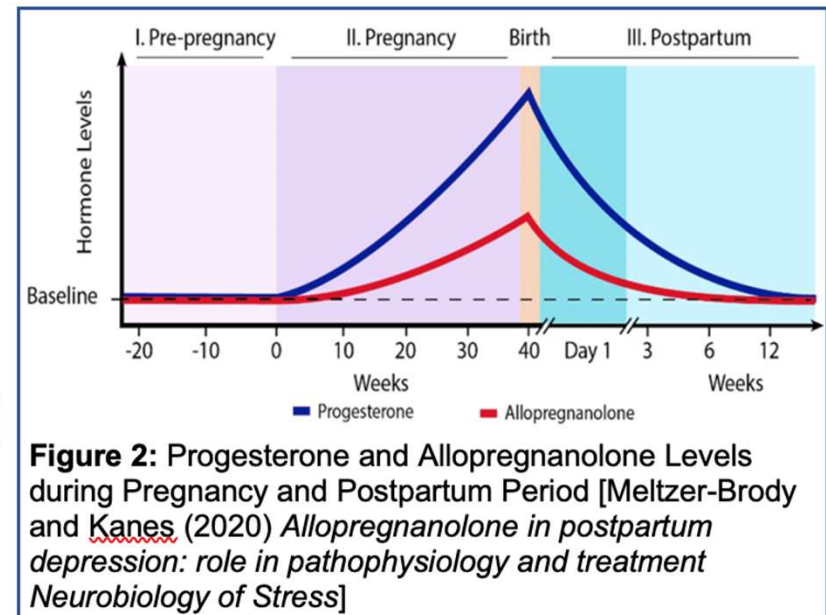


Figure 3. Time to Relapse After Delivery by Drug
Kaplan-Meier estimates of the time from delivery until relapse to cigarettes, alcohol, marijuana or cocaine in the 24 months postpartum.

LET'S TALK ABOUT SEX HORMONES AND ADDICTION

- **Fluctuations** may place women at risk of addiction (telescoping) and increased return to use after periods of abstinence.
- Luteal phase of the menstrual cycle (higher relative progesterone levels) are **less likely to exhibit addictive behaviors** compared to women in the follicular phase (phase with lower relative progesterone levels).
- Period of high progesterone (pregnancy, luteal phase) reduced cravings, periods of low progesterone (postpartum) increased return to use



EXOGENOUS PROGESTERONE

Table 2: Randomized controlled trials of progesterone and substance use among women

Drug Type	Study Population	Treatment	Duration	Results	Authors
Amphetamine	18 women in follicular phase	200 mg progesterone/day vs. placebo	3 days	Progesterone increased positive subjective rating of drug	Reed et al 2010 ⁵³
Cocaine	50 postpartum women	200 mg progesterone/day vs placebo	12 weeks	Less self-reported cocaine and longer time to return to use in treatment group	Yonkers et al 2014 ⁴²
	10 actively using women	300 mg progesterone/day vs placebo	3 days	No difference in smoking cocaine did not differ between groups or craving	Reed et al 2011 ⁵⁴
	10 women in follicular phase	400 mg progesterone vs placebo	Single dose	Subjective feeling of high attenuated in treatment group	Sofuoglu et al 2004 ⁵⁵
	5 non-pregnant women	200 mg progesterone vs placebo	Single dose	Reduced subjective response in treatment group	Sofuoglu et al 2002 ⁵⁶
Tobacco	41 postpartum women	400 mg micronized progesterone vs placebo	8 weeks	Higher proportion achieved abstinence Lower craving scores in treatment group	Forray et al 2017 ⁴¹
	46 postpartum women	400 mg micronized progesterone vs placebo	4 weeks	More median days until return to use in treatment group	Allen et al 2016 ⁵⁷
	12 women who smoked	200 mg of micronized progesterone vs placebo	Single dose	Decreased cravings in treatment group	Sofuoglu et al 2001 ⁵⁸

PROGESTERONE AND PREVENTION

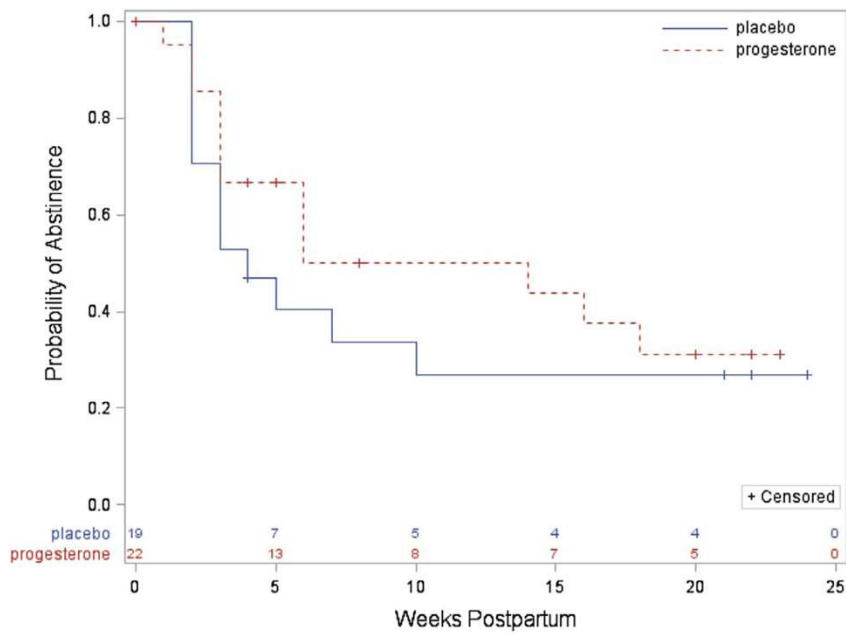


Fig. 2. Time to Relapse after Delivery. Kaplan-Meier estimates of the time (weeks) to smoking relapse among the progesterone and placebo groups from delivery (randomization) through the 3-month follow-up after the 8-week intervention. Included on the bottom of the figure is the number of women at risk for relapse in each group at each time point. HR = hazard ratio.

Progesterone for smoking relapse prevention following delivery: A pilot, randomized, double-blind study

Ariadna Forray^{a,b,*}, Kathryn Gilstad-Hayden^a, Cristine Suppiss^a, Debra Bogen^b, Mehmet Sofuoglu^{a,c}, Kimberly A. Yonkers^{a,d}

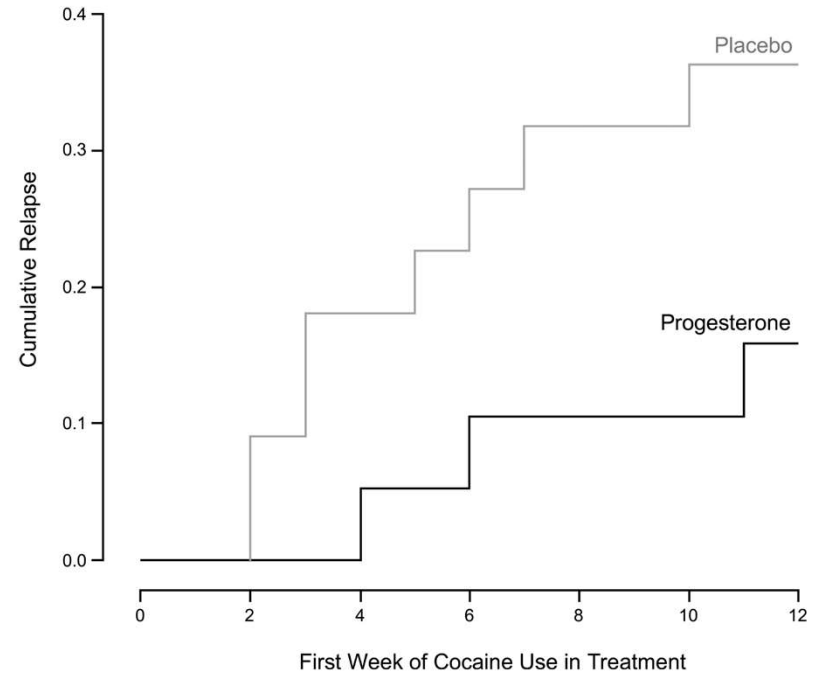


Figure 3. Survival Analysis for Participants Abstinent at Intake
 41 participants were abstinent at intake. 12 relapsed during the 12-week trial period. Relapse included 9 participants assigned to placebo and 3 participants assigned to progesterone.
 (Wilcoxon Statistic =4.71; 95% CI=1.09 to 20.5; p=.05)

Progesterone Reduces Cocaine Use in Postpartum Women with a Cocaine Use Disorder: A Randomized, Double-Blind Study

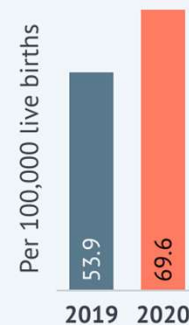
Kimberly Ann Yonkers, M.D.,

Death: we have to talk about it

30 YEARS
NIHCM
DATA INSIGHTS

Mortality Rate Increases Among Pregnant & Postpartum Women

29% increase from 2019 to 2020 in the all-cause mortality rate for pregnant and recently pregnant women



There were significant increases in mortality rates for:

- Pregnancy-related causes
- Nonpregnancy-related causes (drug overdoses, homicide, & car accidents)

Racial and Ethnic Disparities

Compared to White women the mortality rate was:

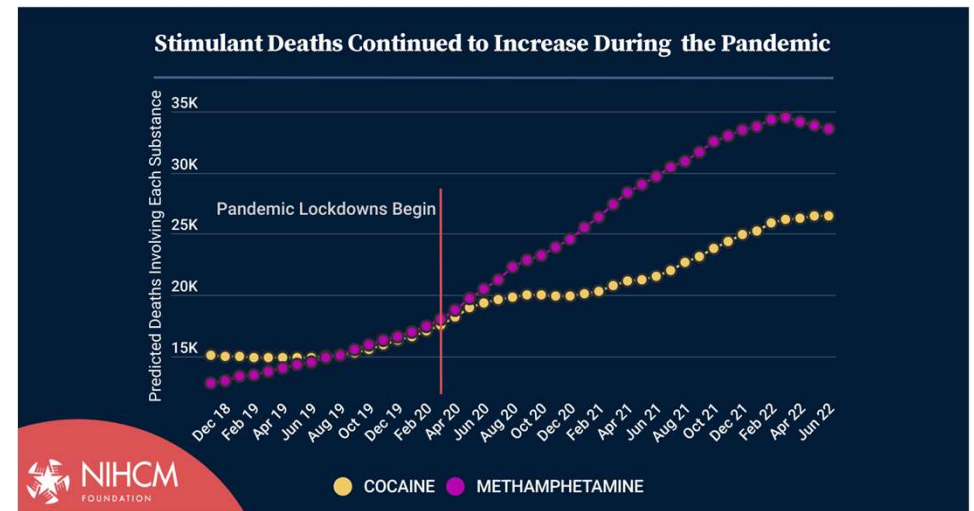
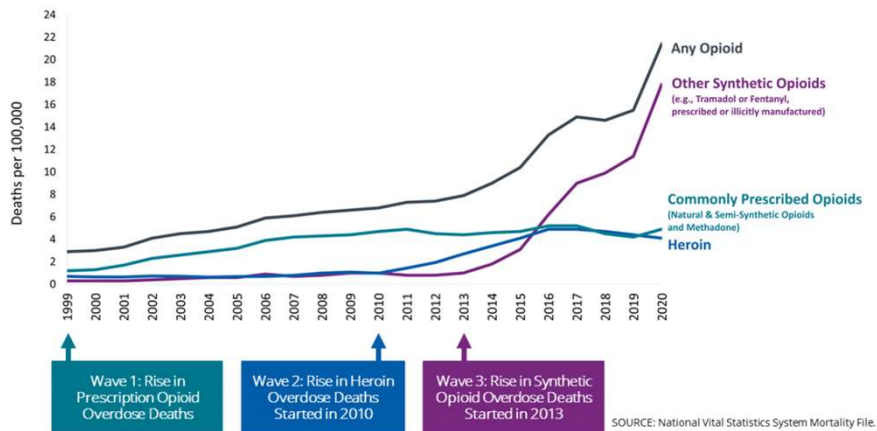
3.5x higher among American Indian or Alaska Native women

1.9x higher among Black women

Note: Recently pregnant women were defined as (1) pregnant at time of death or (2) died within 1 year of pregnancy end
Source: Howard JT, Perrotte JK, Leong C, Grigsby TJ, Howard KJ. Evaluation of All-Cause and Cause-Specific Mortality by Race and Ethnicity Among Pregnant and Recently Pregnant Women in the US, 2019 to 2020. JAMA Netw Open. 2023;6(1):e2253280.

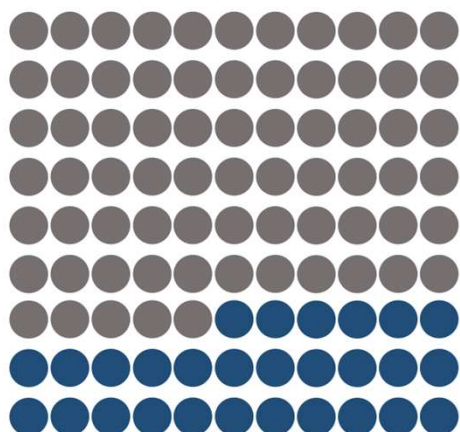
OVERDOSE PANDEMIC

Three Waves of Opioid Overdose Deaths



MATERNAL DEATH: UTAH

Pregnancy Associated Deaths



26%

**Of all
deaths
were
drug-
related**

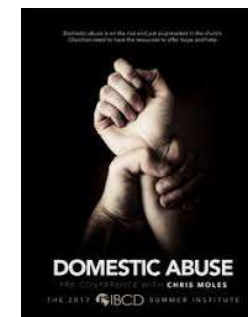
Maternal Morbidity and Mortality: *Original Research*

Pregnancy-Associated Death in Utah

Contribution of Drug-Induced Deaths

Marcela C. Smid, MD, Nicole M. Stone, MPH, Laurie Baksh, MPH, Michelle P. Debbink, MD, PhD, Brett D. Einerson, MD, Michael W. Varner, MD, Adam J. Gordon, MD, and Erin A. S. Clark, MD

Characteristic	Total (n=35)
Age (y)	
15–19	2 (5.7)
20–34	28 (80.0)
35 or more	5 (14.3)
Married	17 (48.6)
Medicaid at delivery	16 (45.7)
Drug misuse or substance use disorder	19 (54.2)
Chronic pain	15 (42.9)
Obesity	13 (37.1)
Mental health diagnosis	27 (77.1)
Depression	24 (69)
Anxiety	19 (54.2)
Schizophrenia	1 (2.9)
Bipolar	2 (5.7)
Prior suicide attempt	8 (22.9)
Prior overdose	9 (25.7)
Prior mental health hospitalization	6 (17.1)
History of lifetime abuse (emotional, mental, physical, sexual)	9 (25.7)
Intimate partner violence	6 (17.1)
Mental health services documented	9 (25.7)
Social work referral documented	14 (40.0)
Prenatal care record	n=26
Drug-related concern in prenatal chart	21 (60.0)
Delivery care record	n=24
Drug-related concern in delivery record (n=24)	18 (75.0)
No. of infants	31
Department of Child and Family Services involvement	7 (22.5)



PREGNANCY AND UTAH DRUG RELATED DEATH

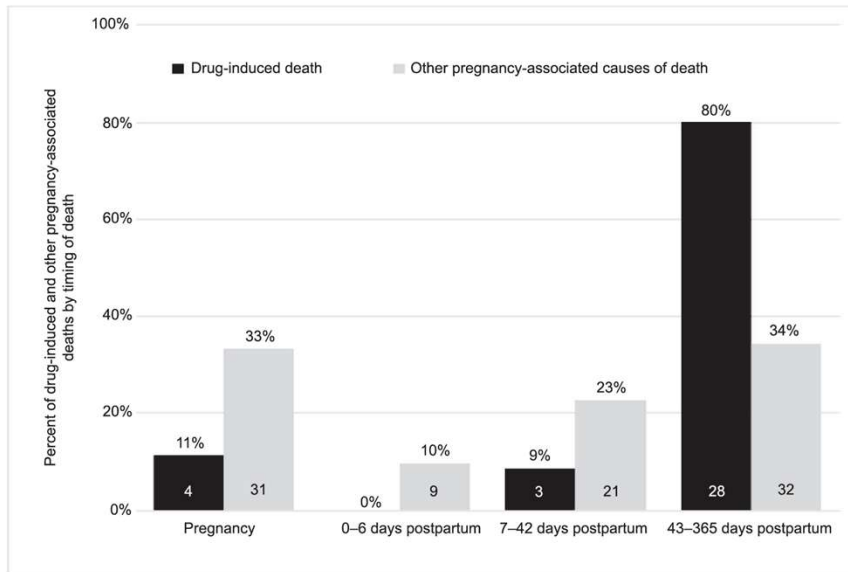
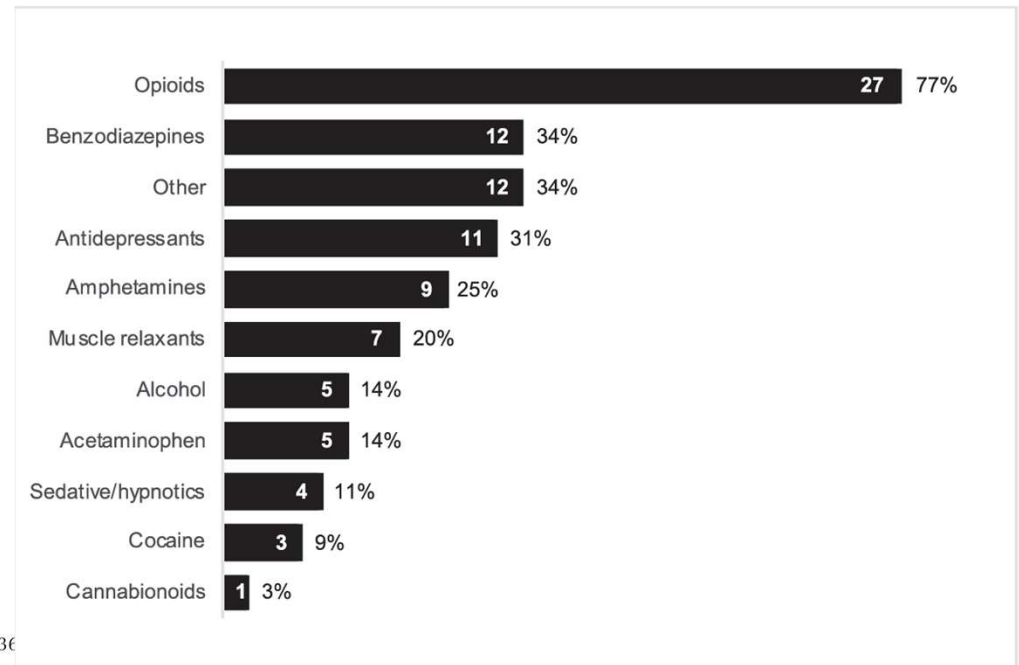


Fig. 1. Proportion of pregnancy-associated, drug-induced deaths vs all pregnancy-associated deaths 2005-2014 (N=136). Smid. Pregnancy-Associated Drug-Induced Deaths in Utah. *Obstet Gynecol* 2019.



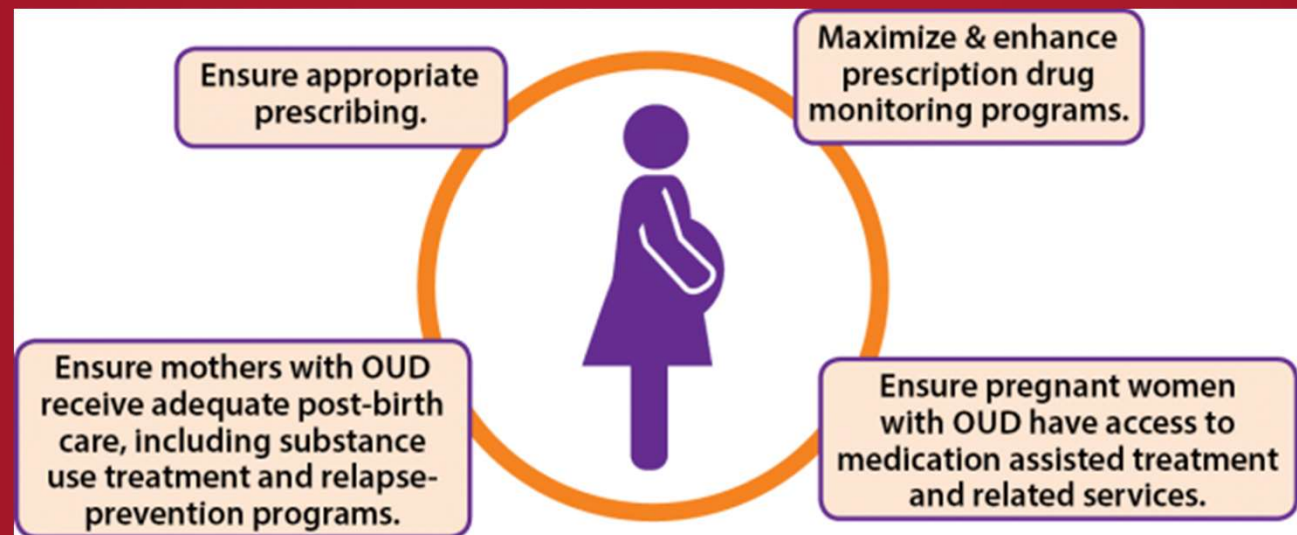
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Care for pregnant and postpartum people with SUD

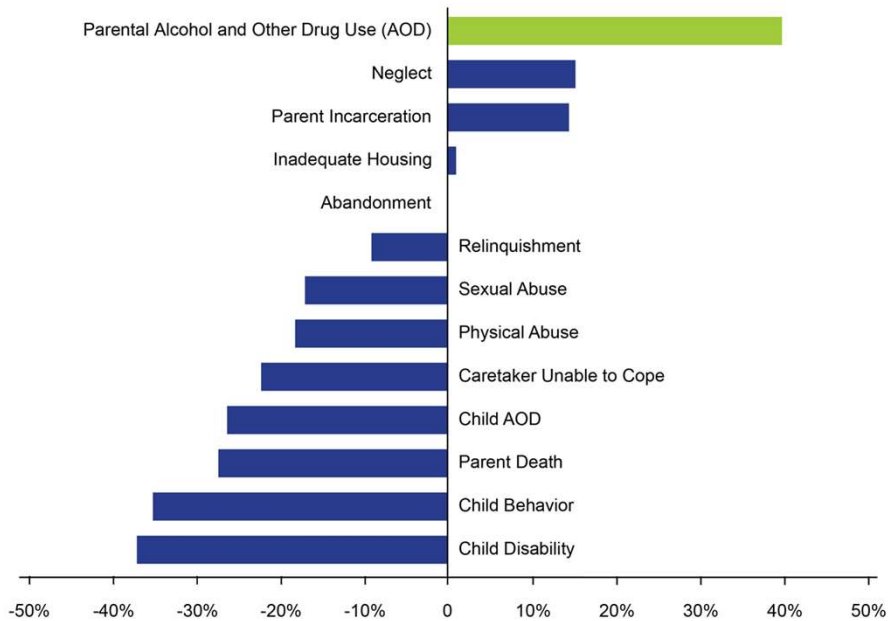


CHILD REMOVAL

THE QUESTION

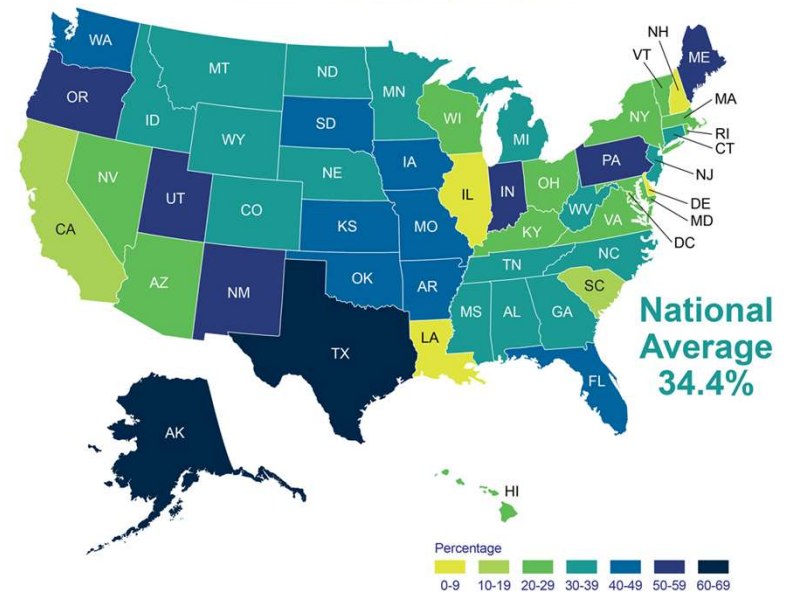
“Is my baby going to get taken away?”

Percentage Change in Reasons for Removal in the United States, 2009 to 2015



Source: AFCARS Data, 2010–2016

Parental Alcohol or Other Drug Use as Reason for Removal by State, 2015

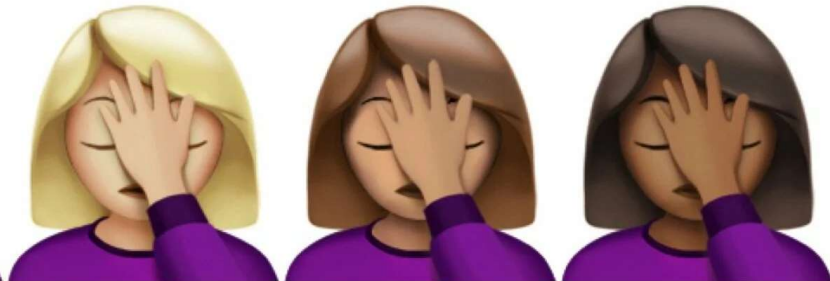
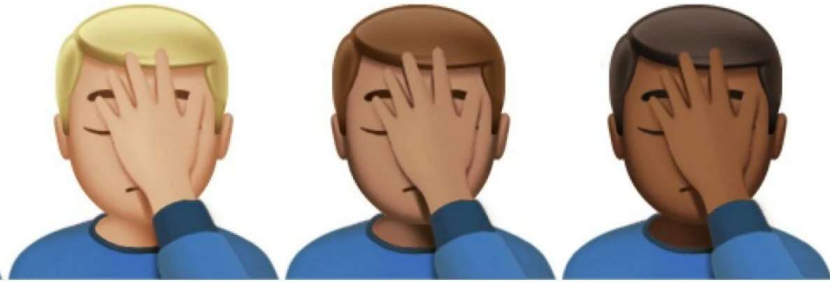


Note: Estimates are based on all children in out-of-home care at some point during Fiscal Year.

Source: AFCARS Data, 2016

UTOX – USE WITH GREAT CAUTION

- It's not
- Provider
- POP Q



Testing results

- **5.2% (!!)** of 136 respondents answered correctly

Questioning Clinical Practice

Challenges in Perinatal Drug Testing

Theresa Kurtz, MD, and Marcela C. Smid, MD, MS

INTEGRATED CARE MODELS

Integrated vs nonintegrated treatment for perinatal opioid use disorder: retrospective cohort study



Daisy J. Goodman, DNP, MPH, CNM; Elizabeth C. Saunders, PhD; Julia R. Frew, MD; Cybele Arsan, MD; Haiyi Xie, PhD; Kyra L. Bonasia, PhD; Victoria A. Flanagan, RN, MS; Sarah E. Lord, PhD; Mary F. Brunette, MD



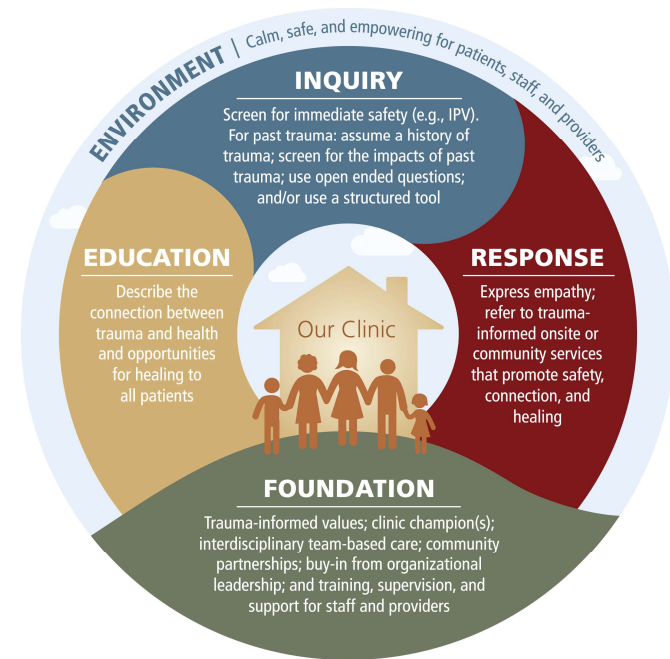
TABLE 4
Delivery characteristics and outcomes

Perinatal outcomes	Entire sample (n = 225)	Integrated cohort (n = 92)	Nonintegrated cohort (n = 133)	P value ^a
Preterm birth, ^c n (%)	43 (20.6)	10 (11.8)	33 (26.6)	<.01
Gestational age at delivery (wk), mean (SD)				<.01
Median, range	37.8 (3.3) 39 (24–42)	38.5 (2.5) 39 (24–41)	37.2 (3.7) 38 (24–42)	
Infant days in hospital, ^b mean (SD)	9.5 (13.6)	6.5 (4.8)	10.7 (16.2)	<.03
Positive maternal urine toxicology screen at delivery, ^b n (%)				
Cannabis	132 (58.7)	33 (35.9)	99 (74.4)	<.0001
Opioids	108 (52.9)	28 (33.7)	80 (66.1)	<.001
Methamphetamine	87 (42.9)	9 (10.8)	78 (65.0)	<.001
Oxycodone	70 (34.3)	2 (2.4)	68 (56.2)	<.001
Amphetamines	69 (34.0)	2 (2.4)	67 (55.8)	<.001
Benzodiazepines	67 (32.8)	2 (2.4)	65 (53.7)	<.001
Cocaine	66 (32.7)	1 (1.2)	65 (54.6)	<.001
Fentanyl	66 (32.8)	2 (2.4)	64 (53.8)	<.001
Nonprescribed buprenorphine	62 (31.0)	0 (0.0)	62 (54.9)	<.001
	24 (11.5)	0 (0.0)	24 (19.7)	<.001

TRAUMA INFORMED CARE

- Strengths based person centered language
- Prenatal: immediate safety and access to services
- Delivery: emphasize respect and dignity, recognize history of trauma with healthcare systems for marginalized communities
- Postpartum: keep dyads together as much as possible
- Support long-term

Trauma-informed Health Care



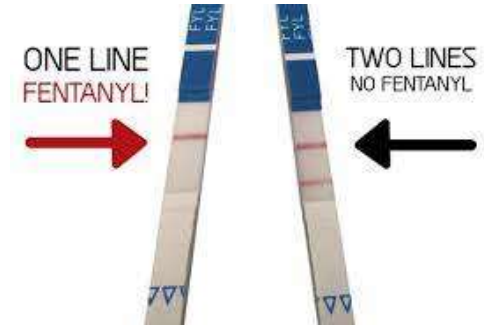
Machtiger, E.L., Davis, K.B., Kimberg, L.S., Khanna, N., Cuca, Y.P., Dawson-Rose, C., Shumway, M., Campbell, J., Lewis-O'Connor, A., Blake, M., Blanch, A., and McCaw, B. (2019). From treatment to healing: inquiry and response to recent and past trauma in adult health care. *Women's Health Issues, 29*(2), 97-101.

Interventions for SUD among pregnant and postpartum people



HARM REDUCTION

- Outreach and education
- Needle exchange
 - Reduces HIV and Hep C and other infections
- Overdose prevention education
- Access to naloxone
- Fentanyl test strips



BEHAVIORAL TREATMENT

• Contingency management

- Motivational incentives often financial
- Consistent and strong evidence in non-pregnant or postpartum individuals
 - Reduction of methamphetamine use
 - Higher utilization of other medical
 - Other treatments, decrease in “risky” behaviors
- Limited evidence in cocaine, very little in methamphetamine for pregnant and postpartum individuals



Brown, H. D., & DeFulio, A. (2020). Contingency management for the treatment of methamphetamine use disorder: a systematic review. *Drug and Alcohol Dependence*, 216, 108307.

Bolivar, H. A., Klemperer, E. M., Coleman, S. R., DeSarno, M., Skelly, J. M., & Higgins, S. T. (2021). Contingency management for patients receiving medication for opioid use disorder: a systematic review and meta-analysis. *JAMA psychiatry*, 78(10), 1092-1102.

Higgins, S. T., Wong, C. J., Badger, G. J., Ogden, D. E. H., & Dantona, R. L. (2000). Contingent reinforcement increases cocaine abstinence during outpatient treatment and 1 year of follow-up. *Journal of consulting and clinical psychology*, 68(1), 64.

Schottenfeld, R. S., Moore, B., & Pantalon, M. V. (2011). Contingency management with community reinforcement approach or twelve-step facilitation drug counseling for cocaine dependent pregnant women or women with young children. *Drug and alcohol dependence*, 118(1), 48-55

Elk, R., Mangus, L., Rhoades, H., Andres, R., & Grabowski, J. (1998). Cessation of cocaine use during pregnancy: Effects of contingency management interventions on maintaining abstinence and complying with prenatal care. *Addictive behaviors*, 23(1), 57-64.

MEDICATION FOR OUD SAVES LIVES

- Methadone
- Buprenorphine
- Naltrexone

Significant Racial and Ethnic Disparities Exist in the Use of Medication to Treat Opioid Use Disorder in Pregnancy in Massachusetts

Schiff, DM et al. JAMA Network Open, 2020; 3(5)
DOI:10.1001/jamanetworkopen.20205734

Question: Do differences by maternal race and ethnicity exist in the use of methadone and buprenorphine medications for the treatment of opioid use disorder during pregnancy?

Race/Ethnicity	% of pregnant women who received medication
White non-Hispanic	70%
Black non-Hispanic	46%
Hispanic	49%

In adjusted models, Black non-Hispanic women and Hispanic women were **58-63% less likely to receive any medications** to treat opioid use disorder compared to white non-Hispanic women in pregnancy.


Importance: The use of medications, such as methadone or buprenorphine, for the treatment of opioid use disorder (OUD) has been associated with improvements in the outcomes of mothers and infants; however, only half of all pregnant women with OUD receive these medications.

Race/Ethnicity	% of pregnant women who received medication consistently
White non-Hispanic	41%
Black non-Hispanic	18%
Hispanic	24%


In adjusted models, Black non-Hispanic women and Hispanic women were **66-76% less likely to consistently receive medication** to treat opioid use disorder compared to white non-Hispanic women in pregnancy.

BOTTOM LINE


Significant racial and ethnic disparities exist in prenatal use of medication for OUD. Further investigation needed to explore factors associated with inequitable access to and receipt of medication.



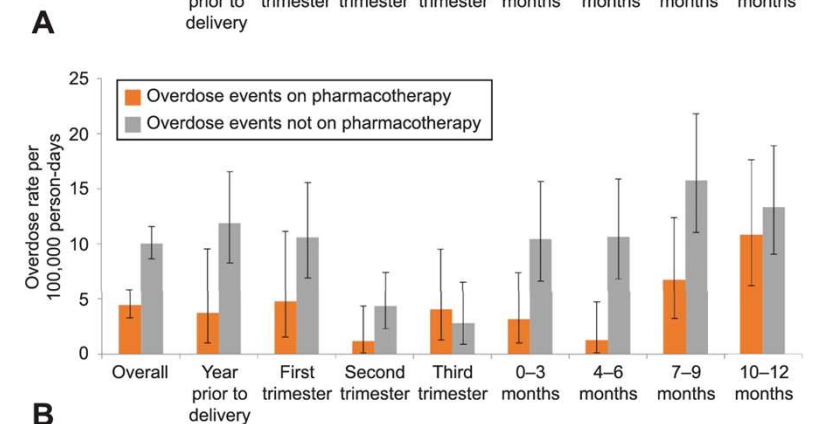
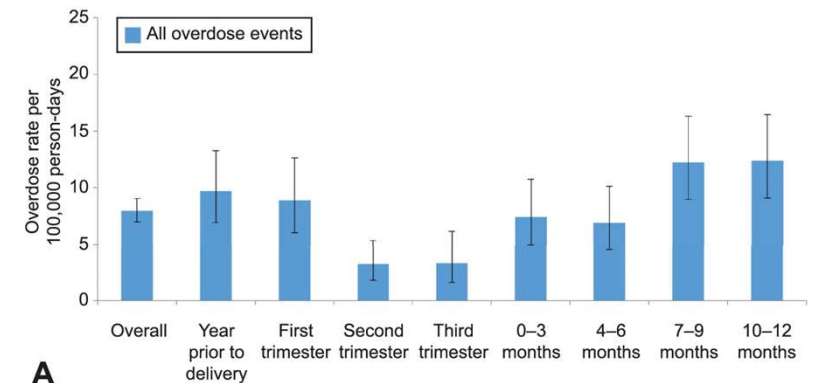
MassGeneral Hospital
for Children



MASSACHUSETTS
GENERAL HOSPITAL



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL



Opioids: Original Research
Fatal and Nonfatal Overdose Among Pregnant and Postpartum Women in Massachusetts

David A. Schiff, MD, MS, Timothy Nielsen, MPH, Mishka Terplan, MD, MPH, Malena Hood, MPH, Dana Bernson, MPH, Hafsatou Diop, MD, MPH, Monica Bharel, MD, MPH, Timothy E. Wilens, MD, Marc LaRoche, MD, MPH, Alexander Y. Walley, MD, MS, and Thomas Land, PhD

MEDICATION FOR METHAMPHETAMINE USE DISORDER

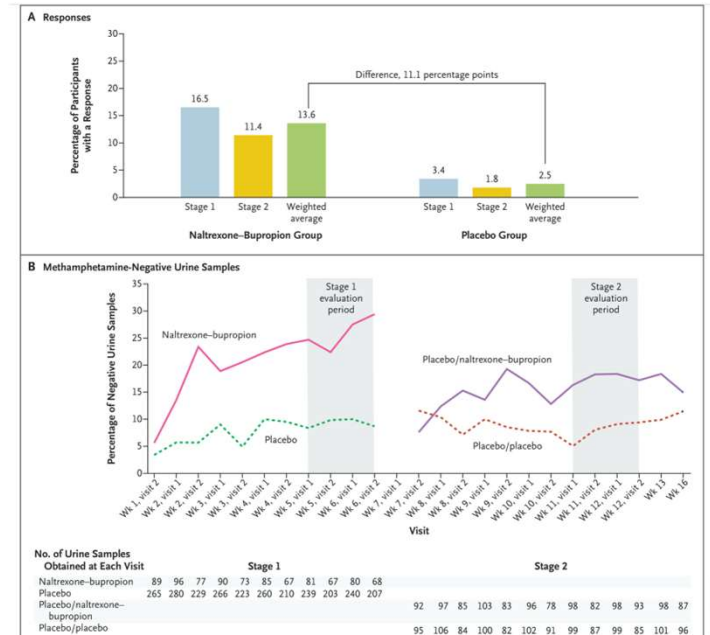
- **Evidence informed**
- NOT evidence based for pregnant and postpartum individuals
- Intervention:
 - Naltrexone 380 mg IM every three weeks
 - Bupropion extended release orally daily
- Response 13.6% in medication group and 2.5% in placebo

• **11.1% improvement overall**

ORIGINAL ARTICLE

Bupropion and Naltrexone in Methamphetamine Use Disorder

Madhukar H. Trivedi, M.D., Robrina Walker, Ph.D., Walter Ling, M.D., Adriane dela Cruz, M.D., Ph.D., Gaurav Sharma, Ph.D., Thomas Carmody, Ph.D., Udi E. Ghitza, Ph.D., Aimee Wahle, M.S., Mora Kim, M.P.H., Kathy Shores-Wilson, Ph.D., Steven Sparenborg, Ph.D., Phillip Coffin, M.D., M.I.A., [et al.](#)



We don't know what we don't know



MEDICATION FOR METHAMPHETAMINE USE DISORDER

RCT of micronized progesterone for postpartum women with methamphetamine use disorder in remission to prevent return to use in postpartum period

Feasibility	Safety	Efficacy
<ul style="list-style-type: none">Achieving our enrollment goals	<ul style="list-style-type: none">No difference in maternal or breastfeeding infants' adverse outcomes between groups	<ul style="list-style-type: none">Decreased return to methamphetamine use among women receiving progesterone compared to placebo

PROMPT
Prevention of Methamphetamine Use
Among Postpartum Women Trial

Summing it up



SUMMING IT UP

- Substance use disorder is a **chronic treatable medical condition of the brain.**
- Your words are important and can themselves be healing.
- Addiction hijacks the brain. Pregnancy can hijack it back. **Addiction may hijack the brain back in the postpartum period,** the most critical time for maternal return to use.
- Stigma and discrimination are woven into many facets of care of women with SUD.
- Treatment modalities are poorly studied in pregnant and postpartum women.

QUESTIONS

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