Mamas, munchkin and methamphetamines

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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

LEARNING OBJECTIVES

- Understand methamphetamine use prevalence and overdose epidemic in the United States
- Identify maternal, fetal and child effects of methamphetamine use in pregnancy
- Describe the evidence-informed treatments for methamphetamine use disorder

Methamphetamine: the new old epidemic

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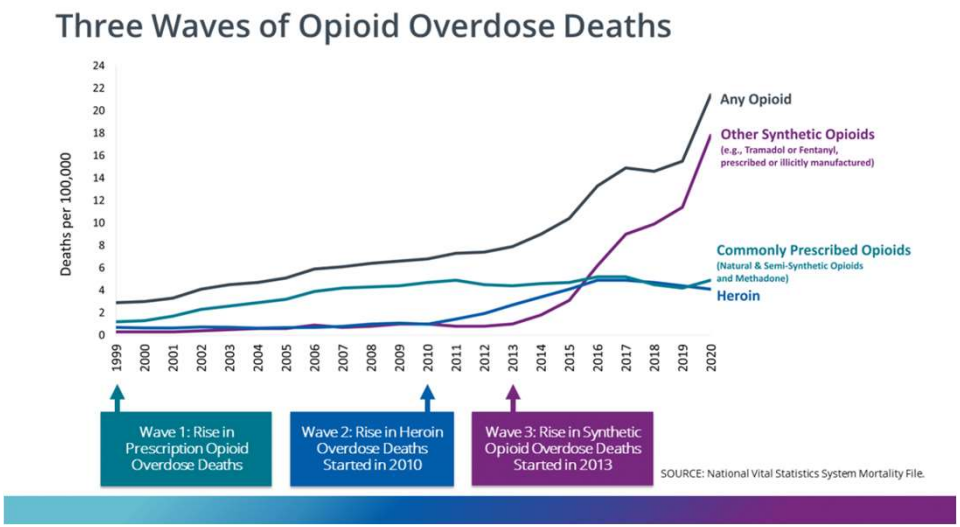
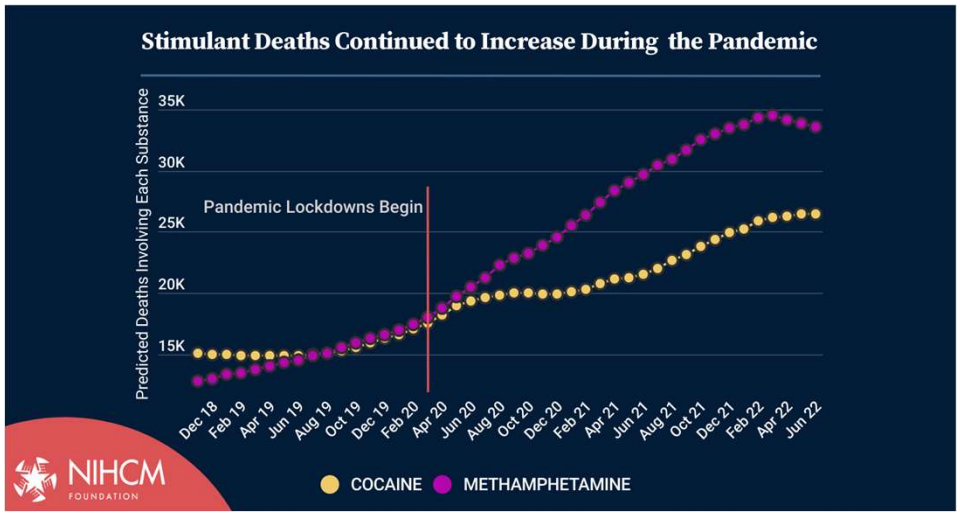
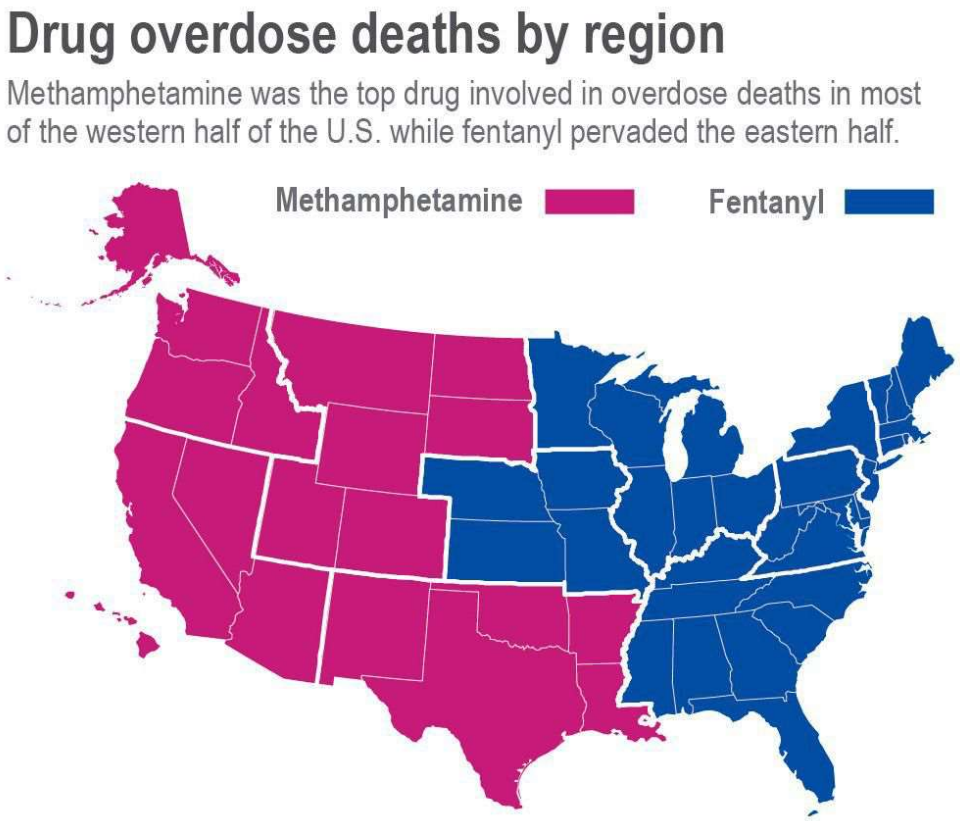
OVERDOSE PANDEMIC



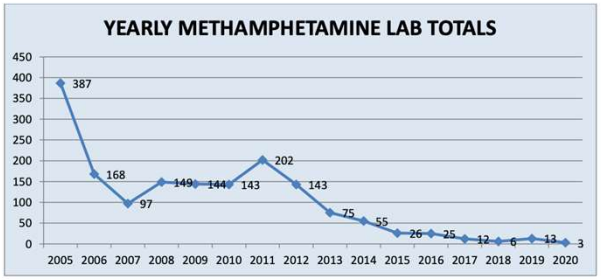


METHAMPHETAMINE PANDEMIC – HOW IT USED TO BE

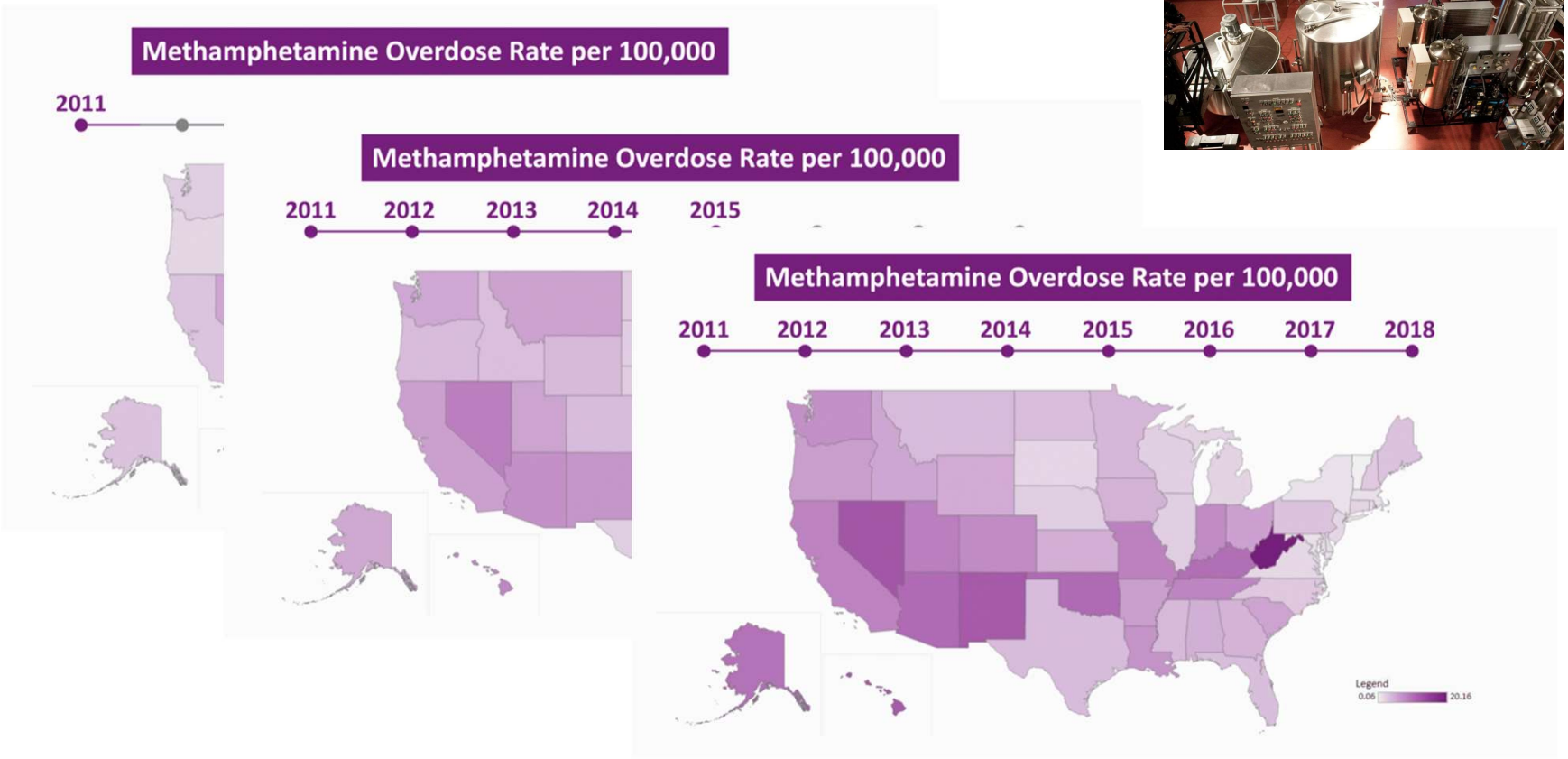


Methamphetamine in Kansas

Kansas law enforcement reported three methamphetamine lab incidents in calendar year 2020, ten fewer than in 2019.



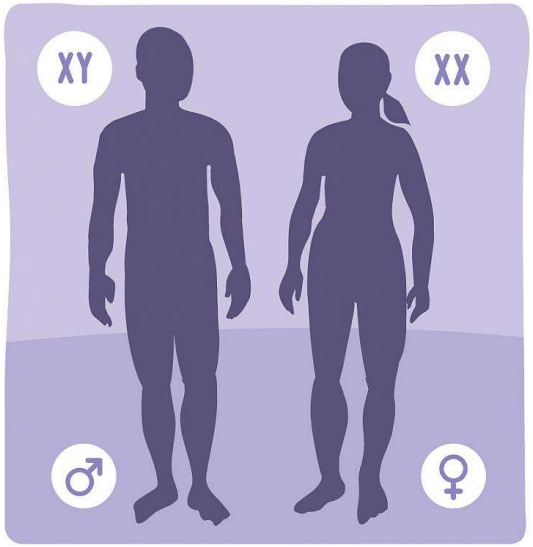
METHAMPHETAMINE PANDEMIC



https://rockinst.org/blog/the-second-wave-of-the-methamphetamine-epidemic/

METHAMPHETAMINE AND SEX & GENDER DIFFERENCES

- **Sex factors**
  - Telescoping - quicker initiation to use disorder than men
  - Females have more chronic medical conditions
- **Gender roles**
  - Caregiving roles affect
  - Weight loss and alertness
- **Sex and gender interactions**
  - Women with co-morbid mental health conditions and meth use disorder
  - Meth use with sexual pleasure increasing risks of STI
- **Gender relations**
  - Partner use influence women's use
  - Meth use increases risk of IPV and assault
  - Perception of safety key in assessing services



Methamphetamine Use & Sex and Gender Informed Approaches

A conversation starter for substance use service providers

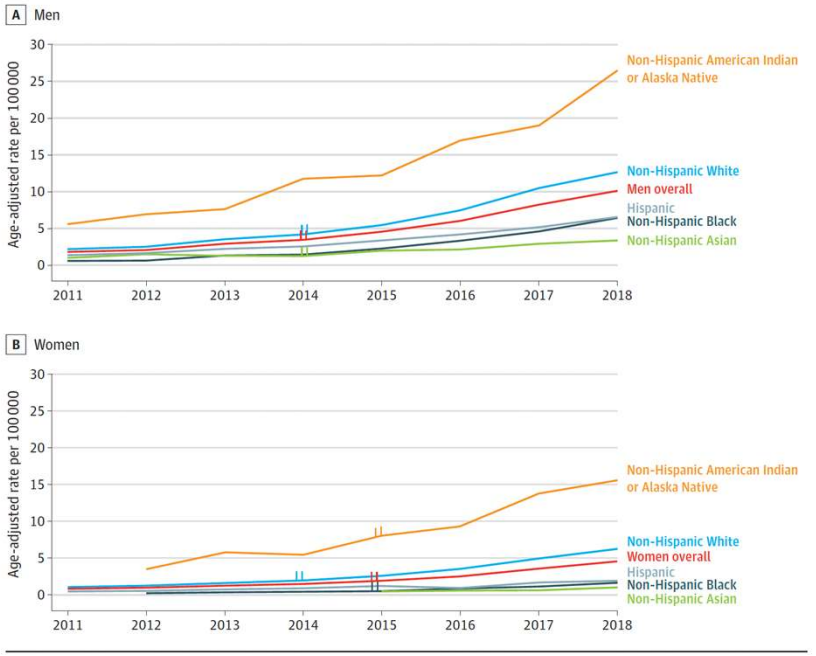
https://cewh.ca/wp-content/uploads/2020/05/CEWH-02-IGH-Handout_Methamphetamines.pdf

OVERDOSE PANDEMIC

- 2015 → 2019, methamphetamine-related deaths **increased 180%**
  - 5526 → 15489 deaths (p value test of trend)
  - **Largest increase** among Native America men and women

- Methamphetamine use disorder
  - Tripled among **heterosexual women** (0.24% → 0.74%, p<0.01)
  - 10x's among **Black individuals** (0.06% → 0.64%, p = 0.07)

Figure. Trends in Methamphetamine Deaths Among US Men and Women Aged 25-54 Years Overall and by Race and Ethnicity



JAMA Psychiatry May 2021 Volume 78, Number 5

JAMA Psychiatry | Original Investigation

Methamphetamine Use, Methamphetamine Use Disorder, and Associated Overdose Deaths Among US Adults

Beth Han, MD, PhD, MPH; Wilson M. Compton, MD, MPE; Christopher M. Jones, PharmD, DrPH, MPH; Emily B. Einstein, PhD; Nora D. Volkow, MD

STIMULANT OVERDOSE

- **Fentanyl contamination**
  - 67% increase in methamphetamine tested positive for fentanyl
  - Cocaine overdose rise essentially entirely fentanyl related
  - Methamphetamine independently increasing
- Combination of opioid use disorder and methamphetamine use disorder
  - Myth that methamphetamine prevents overdose
  - Substitute methamphetamine when opioids harder to obtain
  - "Help me function"
- Combination enhances toxicity and lethality by exacerbating cardiovascular and pulmonary effects

https://www.drugabuse.gov/about-nida/noras-blog/2020/11/rising-stimulant-deaths-show-we-face-more-than-just-opioid-crisis

https://www.drugabuse.gov/drug-topics/trends-statistics/overdose-death-rates

Methamphetamine and pregnancy, lactation and fetal/child effects

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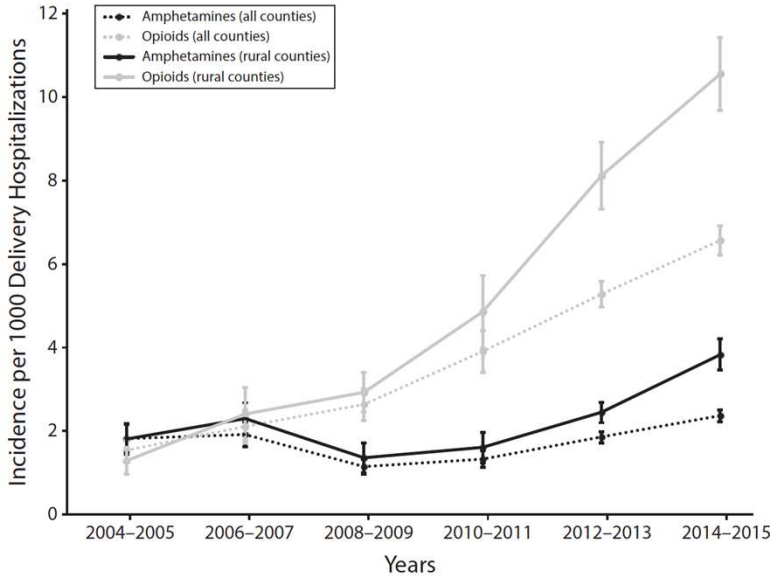
PREGNANCY AND METHAMPHETAMINE

- Amphetamines and opioid deliveries increased **disproportionately** in rural versus urban counties
  - 0.2% of all deliveries
  - 1% deliveries in rural West
  - 5.2% in highest use areas



Note. The sample size was n = 47 164 263. All data are survey-weighted and represented as rate per 1000 delivery hospitalizations. Whiskers indicate 95% confidence intervals.

FIGURE 1—National Trends in Amphetamine and Opioid Use Among Delivering Women: National Inpatient Sample, United States, 2004–2015

Amphetamine- and Opioid-Affected Births: Incidence, Outcomes, and Costs, United States, 2004–2015

Lindsay K. Admon, MD, MSc, Gavin Bart, MD, PhD, Katy B. Kozhimannil, PhD, MPA, Caroline R. Richardson, MD, Vanessa K. Dalton, MD, MPH, and Tyler N. A. Winkelman, MD, MSc

PREGNANCY AND METHAMPHETAMINE

- More antepartum admissions
- Preterm delivery
- **Pre-eclampsia**
- **Placental abruption**
- Severe mortality and morbidity
- More expensive

TABLE 2—Adjusted Health Outcomes, Health Care Utilization, and Expenditures Among Hospital Deliveries Complicated by Amphetamine and Opioid Use: National Inpatient Sample, United States, 2014–2015

Variables	Amphetamine Use (n = 18 050)	Opioid Use (n = 50 011)	Other Hospital Deliveries (n = 7 545 380)
Antenatal diagnoses, weighted % (95% CI)			
Preeclampsia	9.3 (8.2, 10.4)	4.4 (4.0, 4.9)	4.8 (4.7, 4.8)
Placental abruption	4.3 (3.6, 5.0)	3.1 (2.8, 3.5)	1.0 (1.0, 1.1)
Clinical outcomes, weighted % (95% CI)			
Preterm delivery (< 37 wk)	16.7 (15.3, 18.0)	12.6 (11.9, 13.4)	5.8 (5.7, 5.9)
Cesarean delivery	37.4 (35.6, 39.3)	34.5 (33.5, 35.6)	32.6 (32.3, 32.8)
Severe maternal morbidity or mortality	3.8 (3.1, 4.4)	2.4 (2.1, 2.7)	1.6 (1.6, 1.7)
Health care utilization: hospital transfer, weighted % (95% CI)	1.1 (0.7, 1.4)	0.63 (0.47, 0.81)	0.14 (0.12, 0.16)
Length of stay, days, mean (95% CI)			
All deliveries	2.9 (2.9, 3.0)	3.0 (2.9, 3.1)	2.6 (2.6, 2.7)
Vaginal deliveries	2.4 (2.3, 2.5)	2.5 (2.5, 2.6)	2.2 (2.2, 2.2)
Cesarean deliveries	4.0 (3.8, 4.1)	4.3 (4.1, 4.4)	3.6 (3.5, 3.6)
Cost per delivery hospitalization, US $, mean (95% CI)[a]			
All deliveries	5700 (5500, 5900)	5400 (5200, 5500)	4600 (4600, 4700)
Vaginal deliveries	4100 (4000, 4200)	4300 (4100, 4500)	3500 (3500, 3600)
Cesarean deliveries	7300 (7100, 7600)	7500 (7200, 7800)	6100 (6000, 6200)

PREGNANCY AND METHAMPHETAMINE

- Complicated by poor prenatal care/poor pregnancy dating
- Severe preeclampsia
- Preterm Labor
- IUGR
- Maternal cardiac problems/pulmonary edema
- Abruption-more with cocaine

Table 1. Maternal Demographics

	Methamphetamine Users (n=276)	Control Patients (n=34,055)	*P**
Age younger than 20 y	25 (9)	5,449 (16)	<.01
Obstetric visits fewer than 5	190 (69)	3,324 (10)	<.001
Hispanic ethnicity	152 (55)	24,179 (71)	<.001
Married	34 (12)	15,686 (46)	<.001

Data are n (%) unless otherwise specified.
* *P* from χ^2 test.

Table 2. Perinatal Outcomes

Perinatal Characteristics	Methamphetamine Users (n=273)	Control Patients (n=34,055)	*P**
Preterm delivery	139 (52)	5,627 (17)	<.001
1-min Apgar score less than 4	16 (6)	665 (2)	<.001
5-min Apgar score less than 7	16 (6)	328 (1)	<.001
Cesarean delivery	79 (29)	7,730 (23)	<.02
Neonatal mortality	11 (4)	325 (1)	<.001
Maternal obstetric + intensive care unit admissions	6 (2)	95 (0.3)	<.001

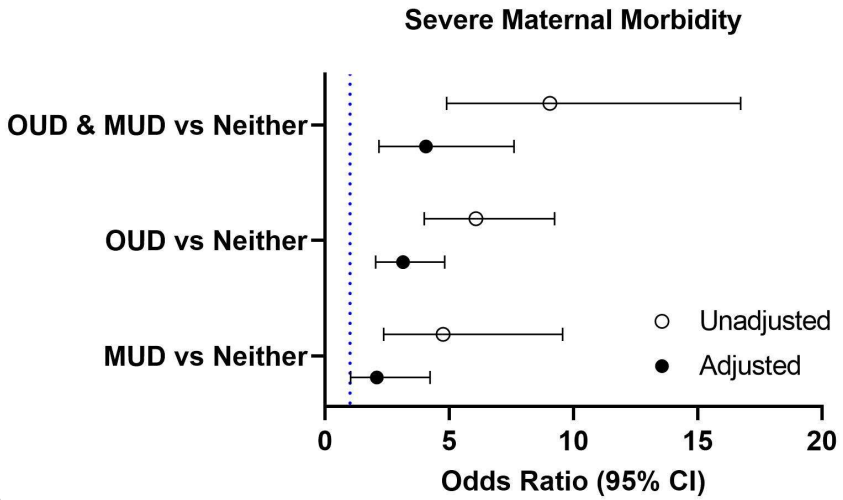
Data are n (%) unless otherwise specified.
* *P* from χ^2 test.

Methamphetamine Use During Pregnancy
Maternal and Neonatal Implications

Meadow M. Good, DO, Ido Solt, MD, Joann G. Acuna, MD, Siegfried Rotmensch, MD, and Matthew J. Kim, MD

PREGNANCY AND METHAMPHETAMINE

- Utah Population Database Data
  Demographics
  - 22% with MUD only **non-White**
  - 93% with OUD/MUD White
- Outcome: severe maternal morbidity (CDC criteria) and mortality
- **More than 1 in 5 with co occurring OUD/MUD and more than 1 in 10 with OUD OR MUD experience SMM**



PREGNANCY AND METHAMPHETAMINE

- Dyads with maternal OUD/MUD, OUD and MUD are at increased risk for:
  - neonatal abstinence syndrome
  - Preterm birth
  - Neonatal death
- Lack of maternal MH diagnosis may indicate less access to evidence-based care, which may explain higher risk of NAS, and warrants further investigation.

	OUD/MUD	OUD only	MUD only	Neither	p
	N (%)				
	n=82	n=281	n=100	n= 135,983	
Maternal characteristics					
Neonatal Morbidity and Mortality					
NAS	22 (27.2)	61 (22.3)	15 (15.5)	783 (0.6)	<.001
Grade 3 or 4 IVH	0 (0.0)	0 (0.0)	1 (1.0)	127 (0.1)	0.026
NEC	0 (0.0)	0 (0.0)	0 (0.0)	60 (0.0)	0.977
Seizure	0 (0.0)	1 (0.4)	0 (0.0)	107 (0.1)	0.404
RDS	8 (9.9)	30 (10.9)	4 (4.1)	6496 (4.8)	<.001
HIE	0 (0.0)	1 (0.4)	1 (1.0)	167 (0.1)	0.052
PTB < 37w	4 (16.0)	9 (12.5)	8 (24.2)	5476 (10.2)	0.039
Gestational age mean (SD)	38.0 (3.7)	38.3 (2.6)	38.3 (3.2)	38.6 (2.1)	0.260
Neonatal death	1 (3.8)	1 (1.1)	2 (5.1)	586 (1.0)	0.038

Abbreviations: NAS neonatal abstinence syndrome; IVH intraventricular hemorrhage; NEC necrotizing enterocolitis; RDS respiratory distress syndrome; HIE hypoxic ischemic encephalopathy; PTB preterm birth; SD standard deviation; 5.7% of deliveries missing GA at delivery.

- SMFM Poster 2022

PREGNANCY AND METHAMPHETAMINE

TABLE. Summary of Patients With Methamphetamine-Associated Cardiomyopathy in Pregnancy

Patient No.	Presentation	Delivery	Neonatal birth weight (g)	Neonatal complications	Maternal outcome
1	25 weeks' GA with hypertension, EF 30%-35%, nonreassuring fetal status, normal right heart catheterization	Repeat cesarean delivery at 25 weeks' GA	620	RDS requiring intubation, grade III/IV IVH, ROP, NICU admission (94 d)	Discharged on POD3; presented again at 7 mo postpartum with hypertensive crisis and positive UDS for methamphetamines
2	23 weeks' GA with shortness of breath, EF 20%	Repeat cesarean delivery at 32 weeks' GA for worsening shortness of breath, elevated right ventricular and pulmonary artery pressures	1690	RDS requiring intubation, NICU admission (27 d)	Discharged on POD13; echocardiogram at 5 wk postpartum with EF 20%-25%; echocardiogram at 6 mo postpartum with EF 20%-30%
3	11 weeks' GA with history of methamphetamine-associated cardiomyopathy, EF 35%	Spontaneous vaginal delivery; induction of labor at 37 weeks' GA for worsening symptoms, elevated right ventricular and pulmonary artery pressures	2380	None	Discharged on PPD2; admission for symptom exacerbation at 1 mo postpartum, echocardiogram with EF 30%-35%
4	35 weeks' GA with dyspnea, orthopnea, EF 35%	Repeat cesarean delivery at 37 weeks' GA	3020	None	Discharged on POD2; echocardiogram at 1 y postpartum with EF 50%-55%
5	21 weeks' GA with edema, shortness of breath, orthopnea, EF 10%, normal coronary angiogram	Repeat cesarean delivery at 30 weeks' GA for IUGR with nonreassuring fetal status	920	Hyperbilirubinemia, NICU admission (27 d)	Discharged home on POD8; echocardiograms at 1, 6, and 12 mo postpartum with EF 40%-45%

EF = ejection fraction; GA = gestational age; IUGR = intrauterine growth restriction; IVH = intraventricular hemorrhage; NICU = neonatal intensive care unit, POD = postoperative day; PPD = postpartum day; RDS = respiratory distress syndrome; ROP = retinopathy of prematurity; UDS = urine drug screen.

Methamphetamine-Associated Cardiomyopathy in Pregnancy: A Case Series

Stephanie L. Pierce, MD, MS
Emily W. Zantow, MD
University of Oklahoma Health Sciences Center
Oklahoma City

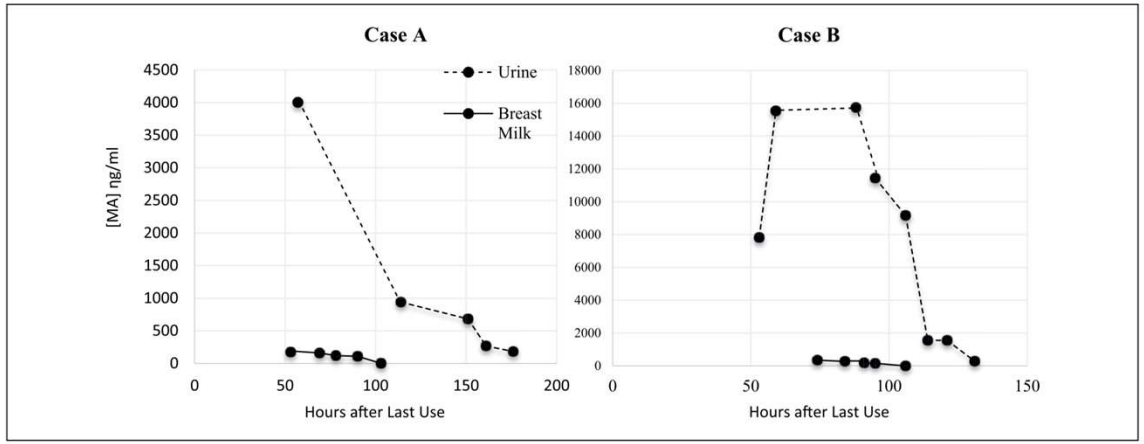
Sabrina D. Phillips, MD
University of Oklahoma Health Sciences Center,
Oklahoma City
Mayo Clinic
Jacksonville, FL

Marvin Williams, DO
University of Oklahoma Health Sciences Center
Oklahoma City

LACTATION

- Limited data
- Recommendation against breastfeeding during "active use" due to infectious disease risk
- How long to wait?

Figure 2. Methamphetamine Concentations ([MA]) in Urine and Breast Milk versus Hours after Last Methamphetamine Use for Cases A and B.

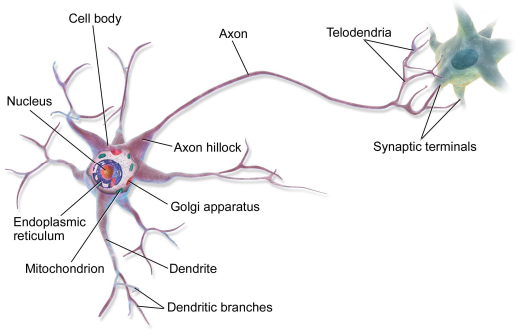


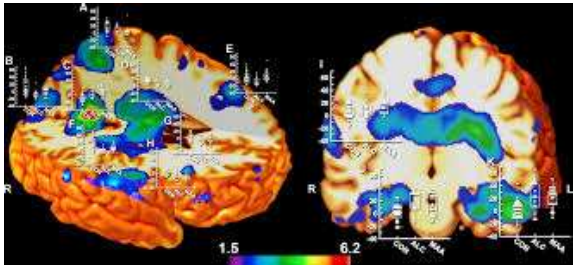
Transfer of Methamphetamine (MA) into Breast Milk and Urine of Postpartum Women who Smoked MA Tablets during Pregnancy: Implications for Initiation of Breastfeeding

Chulathida Chomchai, MD[1], Summon Chomchai, MD, MPH[2], and Ratchada Kitsommart, MD[2]

FETAL EFFECTS

- Methamphetamines are **neurotoxic**
  - Preferential concentration of metabolites in the fetal brain
- Earlier exposure associated with longer lasting alteration in the serotonergic pathways
  - Sex differences in methamphetamine exposure may start in the fetal period





IDEAL STUDY

- Infant Development, Environment and Lifestyle study (IDEAL)
- 412 maternal-child pairs (204 methamphetamine exposed versus 208 unexposed pairs) from the United States and New Zealand.

NEONATAL EFFECTS

- **Neonatal outcomes** (IDEAL study)
  - Increased admission to the NICU
  - Decreased arousal and increased physiological stress
  - **Improved at one month of age.**
- Neonatal abstinence syndrome
  - More jitteriness
  - Rarely requiring medication
  - Less breastfeeding (likely policy related)

Prevalence of Selected Infant Medical Outcomes by MA Exposure

Complication/Condition[a]	Prevalence (%)	MA-Exposed (n = 204), n(%)	Comparison (n = 208), n(%)	Unadjusted p Value	Adjusted p Value[b]
Autonomic stress symptoms	10.4	34 (16.7)	9 (4.3)	<0.001	NA
Poor suck	6.6	22 (10.8)	5 (2.4)	0.001	0.003
Jitteriness/tremors	5.1	20 (9.8)	1 (0.5)	<0.001	NA
Excessive suck	1.9	8 (3.9)	0 (0.0)	0.003	NA
Birth complications					
Admitted to NICU	12.1	35 (17.2)	15 (7.4)	0.003	0.003
Required oxygen	7.5	20 (9.8)	11 (5.3)	0.082	NA
Birth defects					
Cardiac defects	3.4	6 (5.0)	8 (6.6)	0.593	NA
Child abuse report					
Referred to CPS	27.8	109 (54.0)	5 (2.4)	<0.001	<0.001
CPS involved–maternal drug use	27.1	106 (52.5)	5 (2.4)	<0.001	<0.001
CNS symptoms at discharge	3.2	12 (5.9)	1 (0.5)	0.001	NA
Hypertonia	2.2	9 (4.4)	0 (0.0)	0.002	NA
Feeding preference					
Breast-fed	57.0	77 (37.7)	158 (76.0)	<0.001	<0.001
Respiratory symptoms	5.1	14 (6.9)	7 (3.4)	0.107	NA
Respiratory distress	3.9	11 (5.4)	5 (2.4)	0.116	NA

Am J Perinatol. 2012 May ; 29(5): 391–400. doi:10.1055/s-0032-1304818.

Prenatal Methamphetamine Exposure and Short-Term Maternal and Infant Medical Outcomes

CHILD EFFECTS

- **At age 3 years,** differences in cognitive, behavioral, language and emotional outcomes correlated with adverse social environments and *not* prenatal methamphetamine exposure.
- **At age 3 and 5 years**, heavy prenatal methamphetamine exposure (≥ 3 days per week), increased anxiety/depression and attention problems
- **At age 7.5 years** had poorer cognitive function on the Conner's Parent Rating Scale, but not behavioral problems

Methamphetamine use disorder and treatment

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PRINCIPLES OF EFFECTIVE TREATMENT

Principles of Effective Treatment for Adults

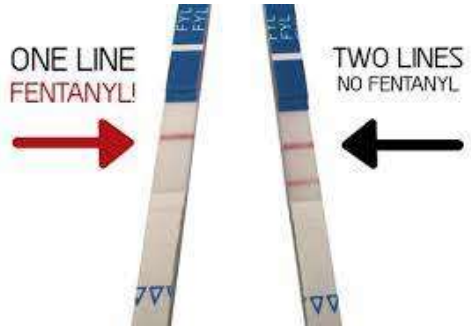
1. Addiction is a complex but treatable disease that affects brain function and behavior.
2. No single treatment is appropriate for everyone.
3. Treatment needs to be readily available.
4. Effective treatment attends to multiple needs of the individual, not just his or her drug abuse.
5. Remaining in treatment for an adequate period of time is critical.
6. Behavioral therapies—including individual, family, or group counseling-- are the most commonly used forms of drug abuse treatment.
7. Medications are an important element of treatment for many patients, especially when combined with counseling and other behavioral therapies.
8. An individual's treatment and services plan must be assessed continually and modified as necessary to ensure that it meets his or her changing needs.
9. Many drug-addicted individuals also have other mental disorders.
10. Medically assisted detoxification is only the first stage of addiction treatment and by itself does little to change long-term drug abuse.
11. Treatment does not need to be voluntary to be effective.
12. Drug use during treatment must be monitored continuously, as lapses during treatment do occur.
13. Treatment programs should test patients for the presence of HIV/AIDS, Hepatitis B and C, tuberculosis, and other infectious diseases, provide risk-reduction counseling, and link patients to treatment if necessary.

National Institute on Drug Abuse, (2012)85 and (2014).92

HARM REDUCTION

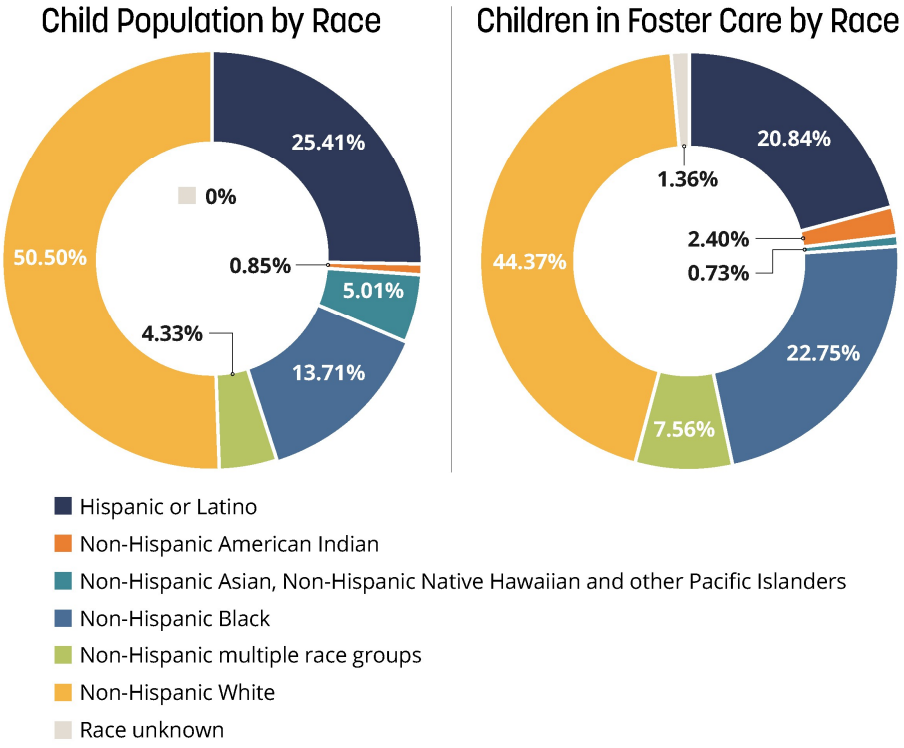
- Outreach and education
- Needle exchange
  - Reduces HIV and Hep C and other infections
- Overdose prevention education
- Access to naloxone
- Fentanyl test strips

UHRC
UTAH HARM REDUCTION COALITION

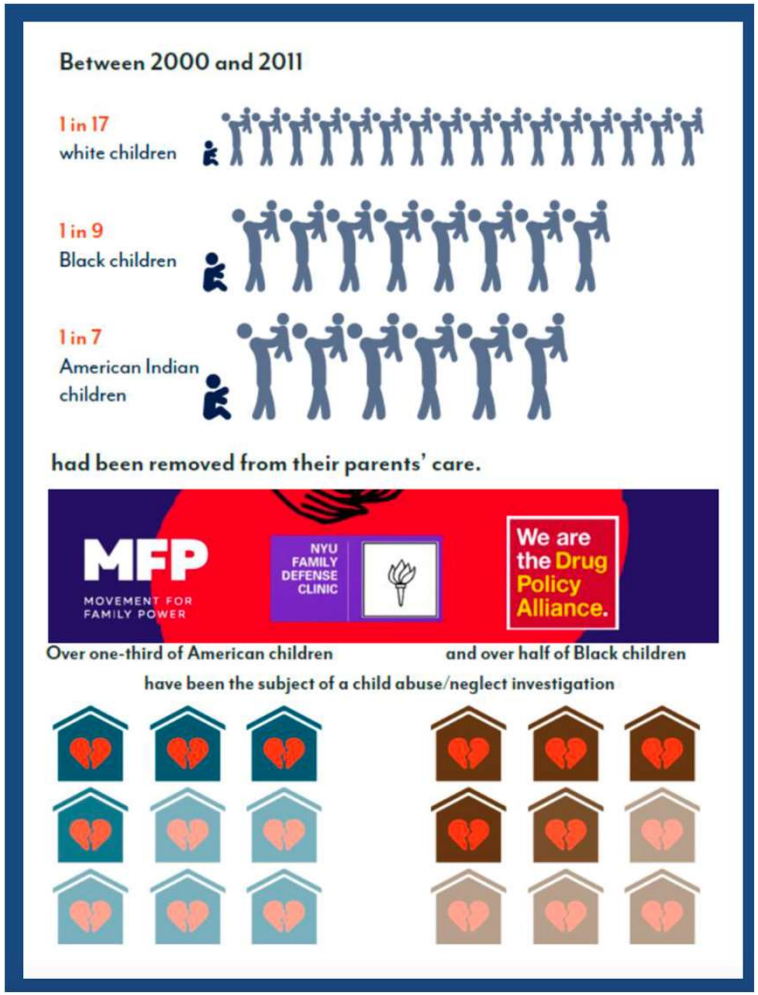


UTAH COALITION FOR
OPIOID OVERDOSE PREVENTION

CHILD REMOVAL



Source: Annie E. Casey Foundation's Kids Count Data Center, 2018



TREATMENT FOR PREGNANT AND PARENTING INDIVIDUALS

- Women generally do better in women-specific treatment programs
- Pregnant and parenting women do best in specialized programs

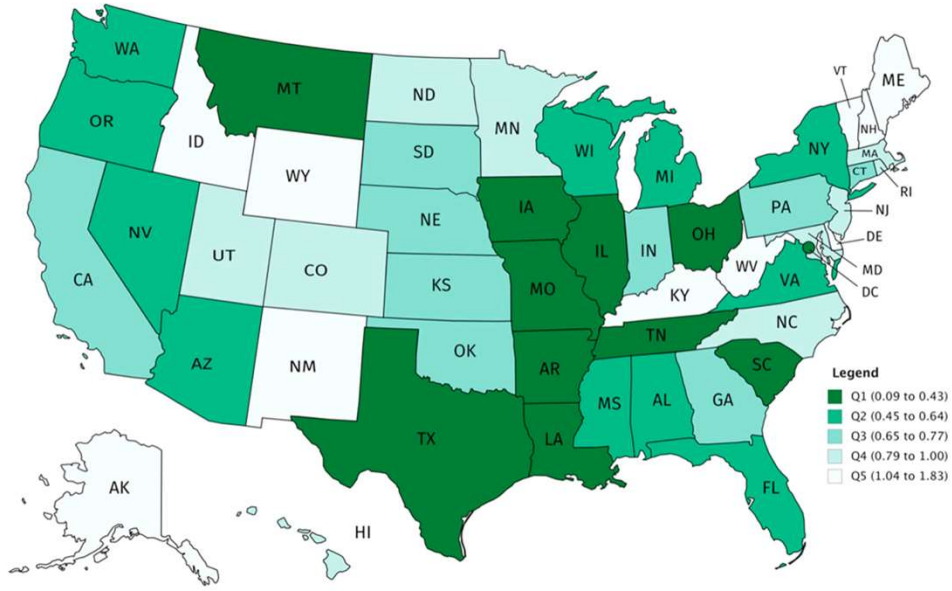


Fig. 3. Geographic distribution of substance use disorder treatment facilities with specialized programs for pregnant and postpartum women per 1000 reproductive age women with substance use disorders, by state.
Notes: National Survey of Substance Abuse Treatment Services, 2018. PPW Programs per 1000 reproductive age women with substance use disorders in a given state were classified into quintiles (Q1 to Q5).

Substance use disorder treatment services for pregnant and postpartum women in residential and outpatient settings

Angélica Meinhofer[a,*], Jesse M. Hinde[b], Mir M. Ali[c]

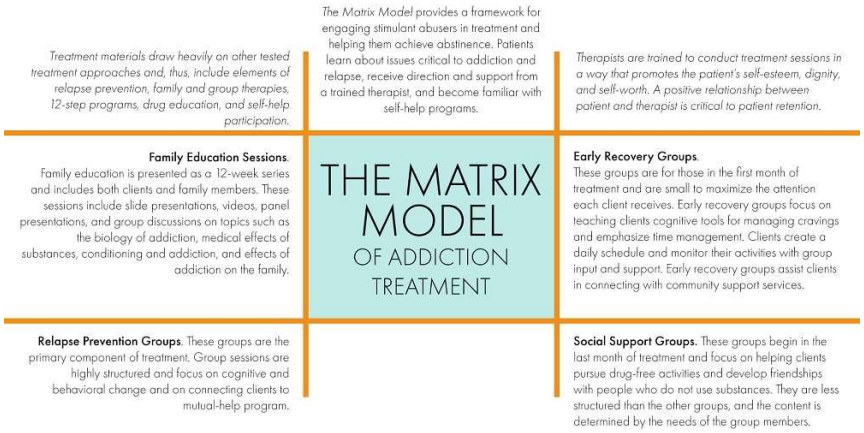
INCARCERATION IS NOT TREATMENT

- In most prisons and jails, **fewer than 5% of women** get mental health care, including substance abuse treatment.
  - Inadequate prenatal care
- Incarceration associated with inadequate nutrition and increased stress, increasing pregnancy complications.
- Treatment **much cheaper** than incarceration

Beck & Maruschak, 2001

BEHAVIORAL TREATMENT

- Contingency management
  - Motivational incentives
- The Matrix Model
  - Manualized outpatient approach
- Cognitive-behavioral therapy (CBT)
- 12-Step facilitation therapy
- Mobile medical application: reSET®



Contingency management for the treatment of methamphetamine use disorder: A systematic review

Hayley D. Brown, Anthony DeFulio *

Western Michigan University, United States

A multi-site comparison of psychosocial approaches for the treatment of methamphetamine dependence

Richard A. Rawson[1], Patricia Marinelli-Casey[1], M. Douglas Anglin[1], Alice Dickow[2], Yvonne Frazier[3], Cheryl Gallagher[4], Gantt P. Galloway[5], James Herrell[4], Alice Huber[1], Michael J. McCann[6], Jeanne Obert[7], Susan Pennell[8], Chris Reiber[1], Denna Vandersloot[9], Joan Zweben[10] and the Methamphetamine Treatment Project Corporate Authors*

University of California, Los Angeles, Integrated Substance Abuse Programs[1], Women's Addiction Treatment Center of Hawaii, Honolulu, Hawaii[2], San Mateo County Alcohol and Drug Services, Belmont, California[3], Center for Substance Abuse Treatment, Rockville, Maryland[4], New Leaf Treatment Center, Concord, California[5], Matrix Institute on Addictions, Costa Mesa, California[6], Matrix Institute on Addictions, Los Angeles, California[7], San Diego Association of Governments, San Diego, California[8], Journey Recovery Chemical Dependency Treatment Program, Billings, Montana[9], East Bay Community Recovery Project, Hayward, California[10]

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.

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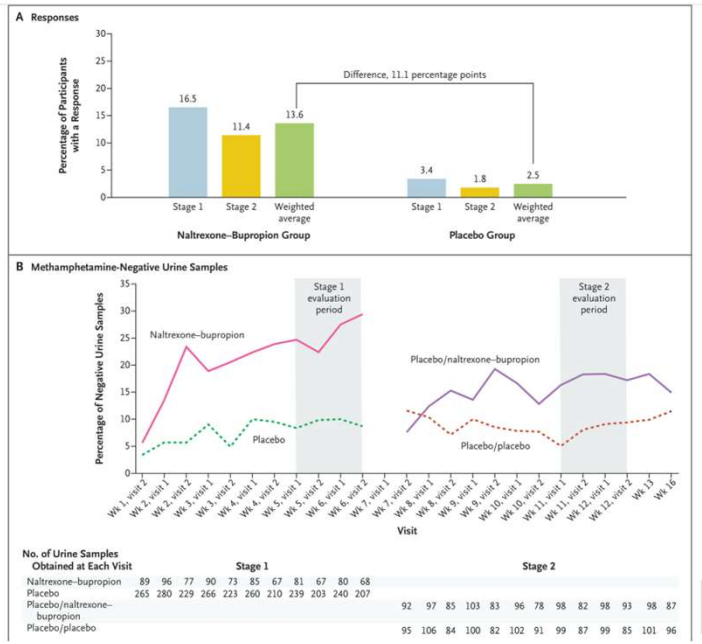
MEDICATION FOR METHAMPHETAMINE USE DISORDER

- **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.

MEDICATION FOR METHAMPHETAMINE USE DISORDER

Substance/Class	Recommendation	Grade
Antidepressants		
Sertraline	Sertraline should not be administered to patients with a methamphetamine-related disorder to achieve abstinence (LoE 2; ⇓⇓).	⇓⇓
Bupropion	Bupropion may be considered in patients with moderate, non-daily methamphetamine use in order to support achievement of abstinence (LoE 2; ⇔).	⇔
Mirtazapine	Mirtazapine should be offered to men who have sex with men (MSM) to reduce consumption and risky sexual behaviour (LoE 2; ⇑⇑)	⇑⇑
Imipramine	Imipramine may be considered to increase the retention rate (LoE 2; ⇔)	⇔
Neuroleptics	No positive recommendation for this group in this treatment goal	
Psychostimulants		
Controlled substances such as d-amphetamine, methylphe-nidate, and the like	Any treatment beyond acute withdrawal involving dopaminergic amphetamine-like analogues ("replacement therapies") should not be offered unless as part of a registered clinical trial (LoE 2; ⇓⇓).	⇓⇓
Modafinil	Modafinil ought not be administered in the post-acute phase (LoE 2; ⇓)	⇓
Combined pharmacological treatments	A combined intravenous treatment with flumazenil, gabapentin and hydroxyzine (PROMETA®) should not be administered (LoE 2; ⇓⇓).	⇓⇓

Evidence-Based Guidelines for the Pharmacologic Management of Methamphetamine Dependence, Relapse Prevention, Chronic Methamphetamine-Related, and Comorbid Psychiatric Disorders in Post-Acute Settings

ISN'T THERE ANYTHING? ANYTHING AT ALL

- RCT: sertraline associated with increased drop-out rate with no change in depression symptoms
- ADHD medications
  - Antidepressants first line
  - Methylphenidate if inadequate symptoms control

Disorder Substance/Class	Recommendation	Grade
Schizophrenia and methamphetamine-associated psychosis (MAP)	The indication for the continuation of neuroleptic therapy ought to be reviewed at the latest after 6 months of treatment in individuals presenting with a methamphetamine-associated psychosis (MAP) (LoE 5; ⇑⇑).	⇑⇑
Comorbid depressive syndromes		
Sertraline	Sertraline should not be used to treat comorbid depressive symptoms in patients with a methamphetamine-related disorder (LoE 2; ⇓⇓).	⇓⇓
Quetiapine	Symptom-oriented therapy with quetiapine may be offered as an attempt to reduce symptoms of depression in patients with methamphetamine abuse disorders (LoE 2; ⇔).	⇔
Food supplements:		
Creatine	For the treatment of comorbid depression (unipolar/bipolar), dietary supplementation with creatine may be considered as an additional attempt to treat depressive symptoms (LoE 3; ⇔).	⇔
Citicoline	For the treatment of comorbid depression (unipolar/bipolar), dietary supplementation with citicoline may be considered as an additional attempt to treat depressive symptoms (LoE 2; ⇔).	⇔
Bipolar disorder		
Quetiapine	For the treatment of comorbid bipolar disorder, quetiapine may be considered as an attempt to reduce both the depressive and manic symptoms (LoE 2; ⇔)	⇔
Risperidone	For the treatment of comorbid bipolar disorder, risperidone may be considered as an attempt to reduce both the depressive and manic symptoms (LoE 2; ⇔)	⇔
Symptomatic treatment of sleep disorders	No evidence-based recommendations can be derived as yet. Medication with no dependence potential should be chosen	
Neurocognitive disorders	No medications for neurocognitive impairment can be recommended (LoE 2; statement).	
Anxiety disorders	At present, no evidence-based recommendation for specific agents can be made	
Attention deficit/hyperactivity disorder persistent into adulthood (ADHD)	When there is an indication for ADHD pharmacotherapy, antidepressants with proven efficacy (for example atomoxetine bupropion, venlafaxine or duloxetine) ought to be offered as the first-line treatment (LoE 5;⇑) Methamphetamine-dependent users should only be treated with methylphenidate in the case of inadequate efficacy of the above-mentioned medications in combination with psychotherapeutic methods. If prescribed, close drug screening monitoring is obligatory. If there are signs of misuse or diversion, methylphenidate ought to be stopped immediately (LoE 5; ⇑).	⇑

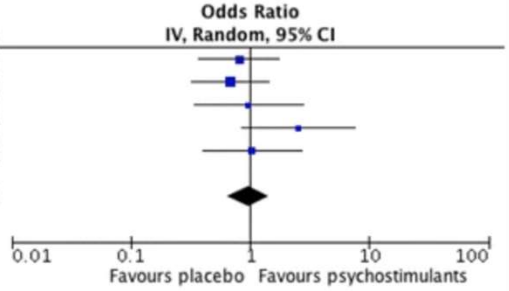
WHAT ABOUT STIMULANTS

From: Efficacy and safety of psychostimulants for amphetamine and methamphetamine use disorders: a systematic review and meta-analysis

a

Study or Subgroup	Psychostimulants Events	Total	Placebo Events	Total	Weight	Odds Ratio IV, Random, 95% CI
Anderson 2012	21	142	12	68	26.1%	0.81 [0.37, 1.76]
Anderson 2015	14	100	20	104	28.3%	0.68 [0.32, 1.44]
Heinzerling 2010	9	34	10	37	14.4%	0.97 [0.34, 2.78]
Heinzerling 2014	12	41	6	43	13.3%	2.55 [0.85, 7.62]
Shoptaw 2008	14	36	14	37	17.9%	1.05 [0.41, 2.69]
Total (95% CI)		**353**		**289**	**100.0%**	**0.97 [0.65, 1.45]**
Total events	70		62			

Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 4.08$, df = 4 (P = 0.40); $I^2 = 2\%$
Test for overall effect: Z = 0.16 (P = 0.87)



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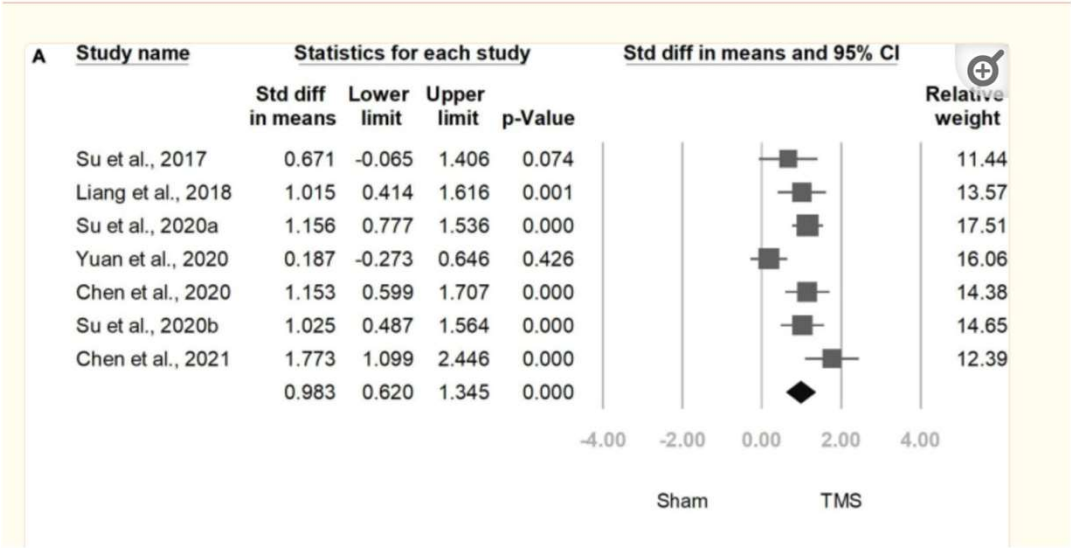
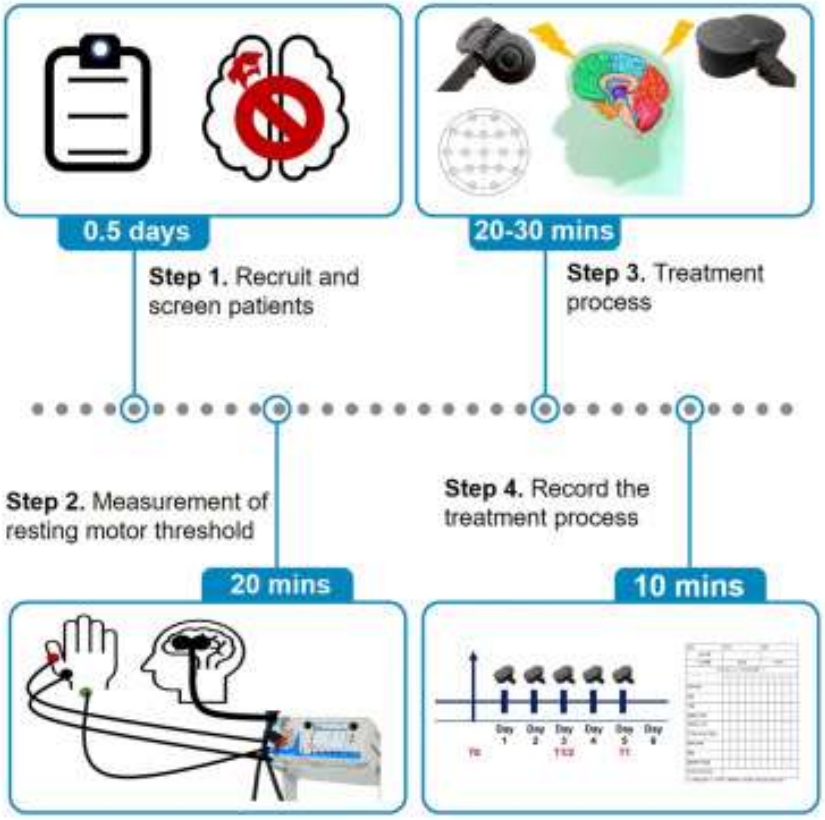
Efficacy and safety of psychostimulants for amphetamine and methamphetamine use disorders: a systematic review and meta-analysis

Meha Bhatt, Laura Zielinski, Lola Baker-Beal, Neera Bhatnagar, Natalia Mouravska, Phillip Laplante, Andrew Worster, Lehana Thabane & Zainab Samaan

TRANSCRANIAL MAGNETIC STIMULATION





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Efficacy of Repetitive Transcranial Magnetic Stimulation in Patients With Methamphetamine Use Disorder: A Systematic Review and Meta-Analysis of Double-Blind Randomized Controlled Trials

Chun-Hung Chang, [1,2,3,†] Meng-Fen Liou, [1,†] Chieh-Yu Liu, [4,5] Wei-Hsin Lu, [6] and Shaw-Ji Chen [7,8,*]

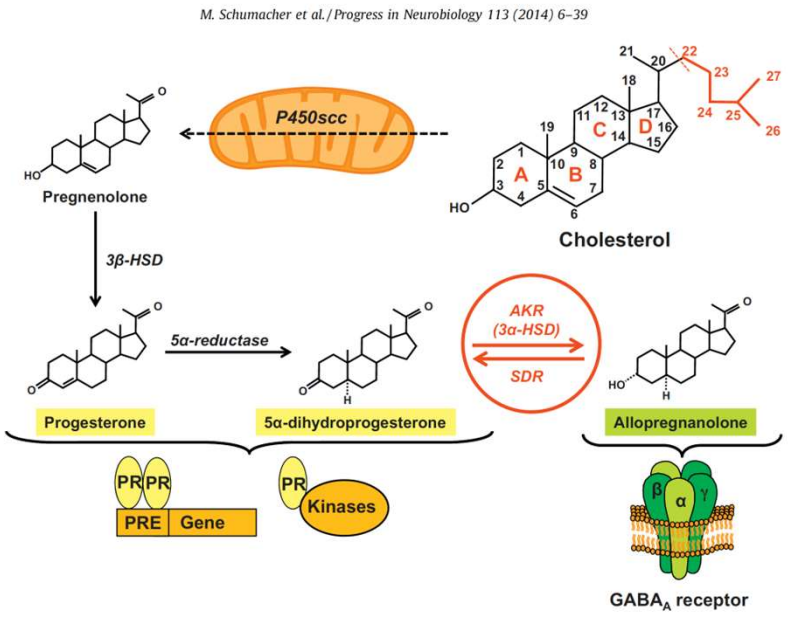
PROMPT TRIAL

- Up to 12 weeks postpartum
- **Intervention:** Micronized progesterone (200 mg twice daily) versus placebo
- **Feasibility**: 40 women
- **Safety:** maternal and neonatal outcomes
- **Primary efficacy outcome:** return to methamphetamine use

ENROLLING!

PROMPT

Prevention of Methamphetamine Use Among Postpartum Women Trial



SUMMING IT UP

- Methamphetamine use disorder is **increasing**, particularly with co-occurring opioid use disorder.
- Methamphetamine associated with both adverse maternal and perinatal outcomes.
- Long term child outcomes are more strongly associated with adverse social settings than methamphetamine exposure.
- Treatment modalities are poorly studied in pregnant and postpartum women.

QUESTIONS

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