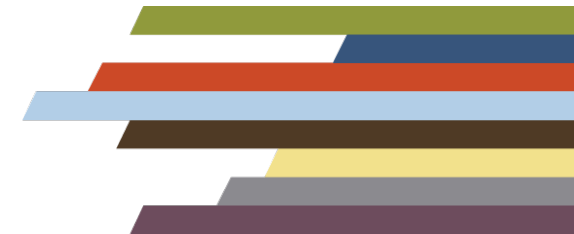


# Women and Stimulant Use

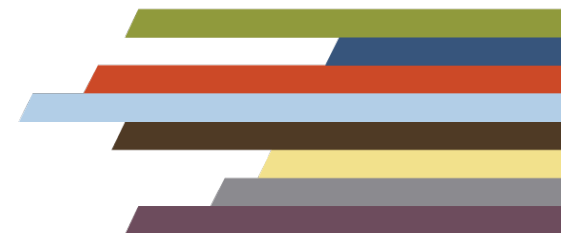
## Mamas, Munchkins and Methamphetamines

Marcela Smid, MD  
Maternal Fetal Medicine  
Addiction Medicine



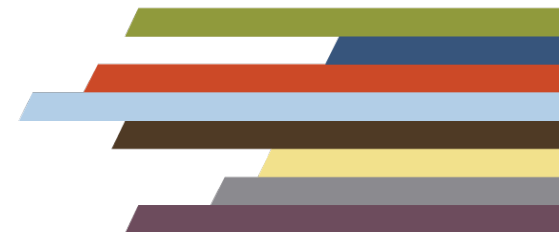
# Disclosure

- Medical advisory committee for Gilead Science Inc. for hepatitis C treatment for pregnant and postpartum women



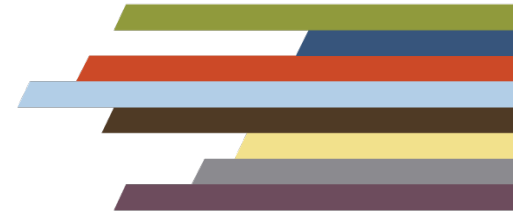
# Who am I?

- Dual boarded in maternal fetal medicine and addiction medicine
- Medical director of SUPeRAD (**S**ubstance **U**se & **P**regnancy – **R**ecovery, **A**ddiction, **D**ependence) Clinic
- **Specialty prenatal care** for women with substance use disorders
- **Co-located services:**
  - OB and postpartum care (up to one year postpartum)
  - Addiction medicine/psychiatry care
  - Pharmacotherapy
  - Emotional support group
  - Social work
  - Recovery peer support
  - Case management from health plan
  - Resource management
- **Motto: “beg borrow and steal for services”**

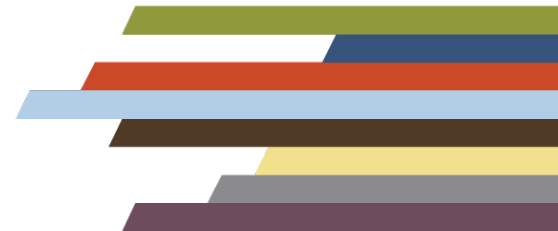


# Learning Objectives

- **The problem**
  - What is addiction and how does pregnancy impact
  - Sex and gender differences in drug use
- **Mamas and munchkins:**
  - Long term health effects and risks of children exposed to substances in utero
  - Breastfeeding
- **Approaches to perinatal substance use**

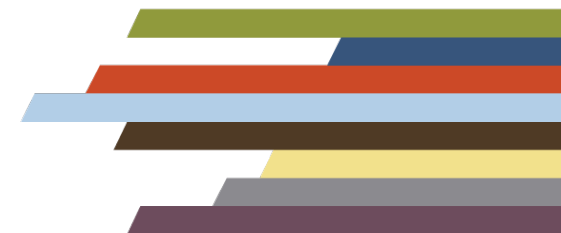
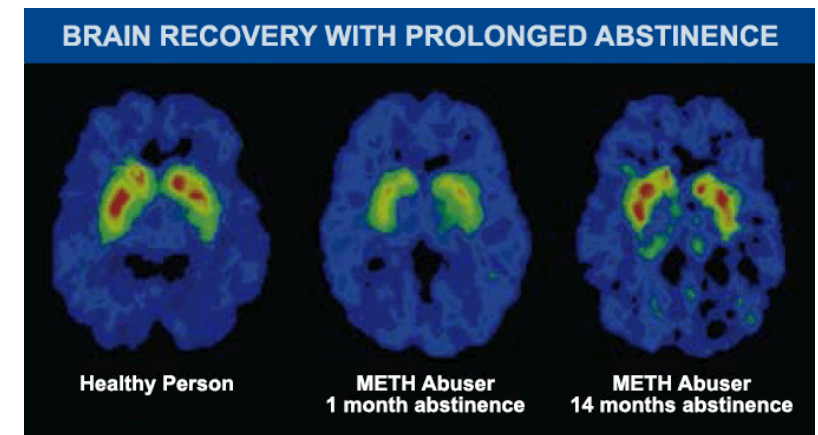
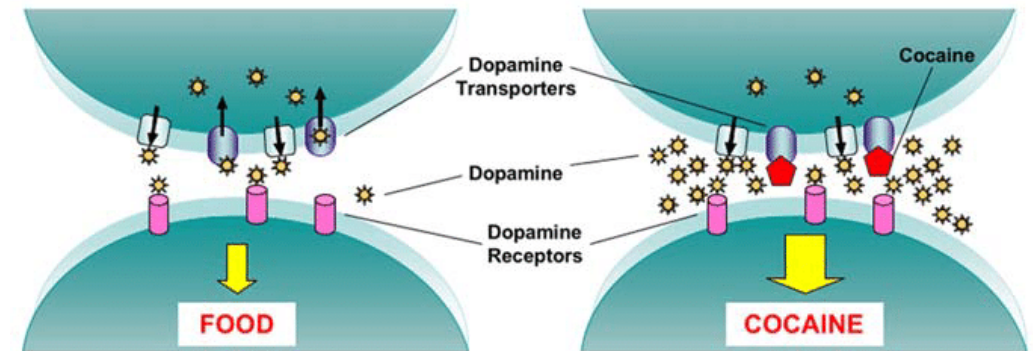


# Perinatal Addiction





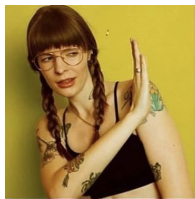
# Definition of Addiction

- **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.
- **Genetic component:** 50% of addiction is hereditary.



# Diction of Addiction

WORDS TO AVOID 	WORDS TO USE 
Addict, alcoholic	Person with substance use disorder, person with addiction
Drug abuser	Person with substance use disorder
Drug abuse	Drug misuse, harmful use, risky use
Drug problem, drug habit	Substance use disorder
Clean	Abstinent, not actively using
Dirty	Actively using
A clean drug screen	Testing negative for substance use
A dirty drug screen	Testing positive for substance use
Former addict, reformed alcoholic	Person in recovery, person in long-term recovery



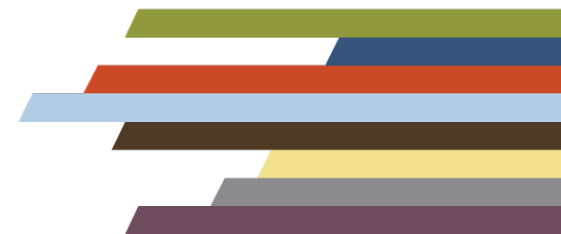
**“ARE YOU CLEAN?”**



**“HAVE YOU BEEN TESTED FOR STIs RECENTLY?”**



# Infants Cannot Have an Addiction



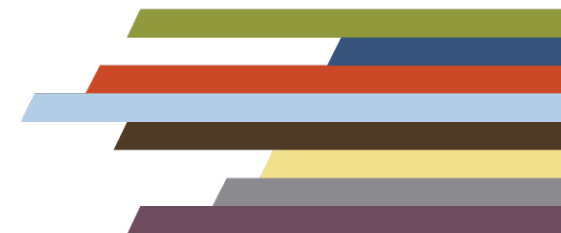
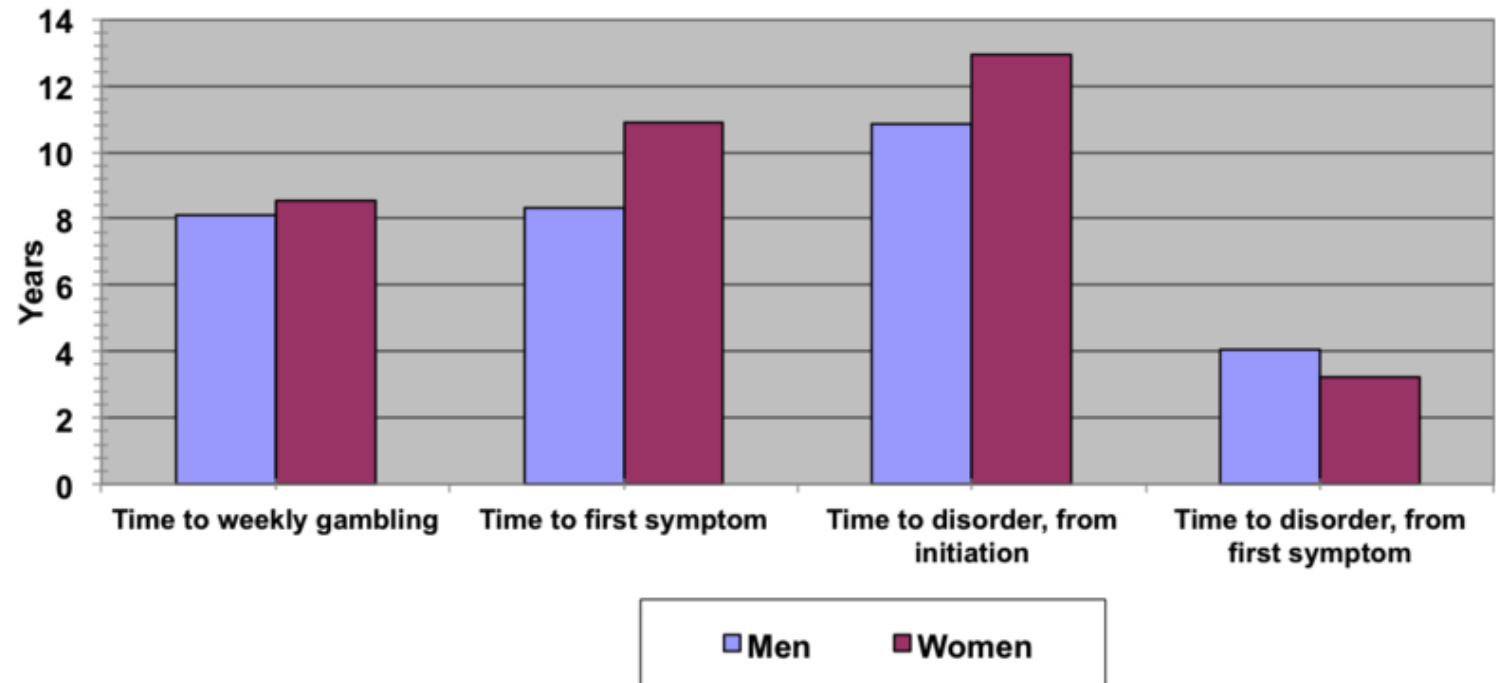


# Sex/Gender and Drug Use



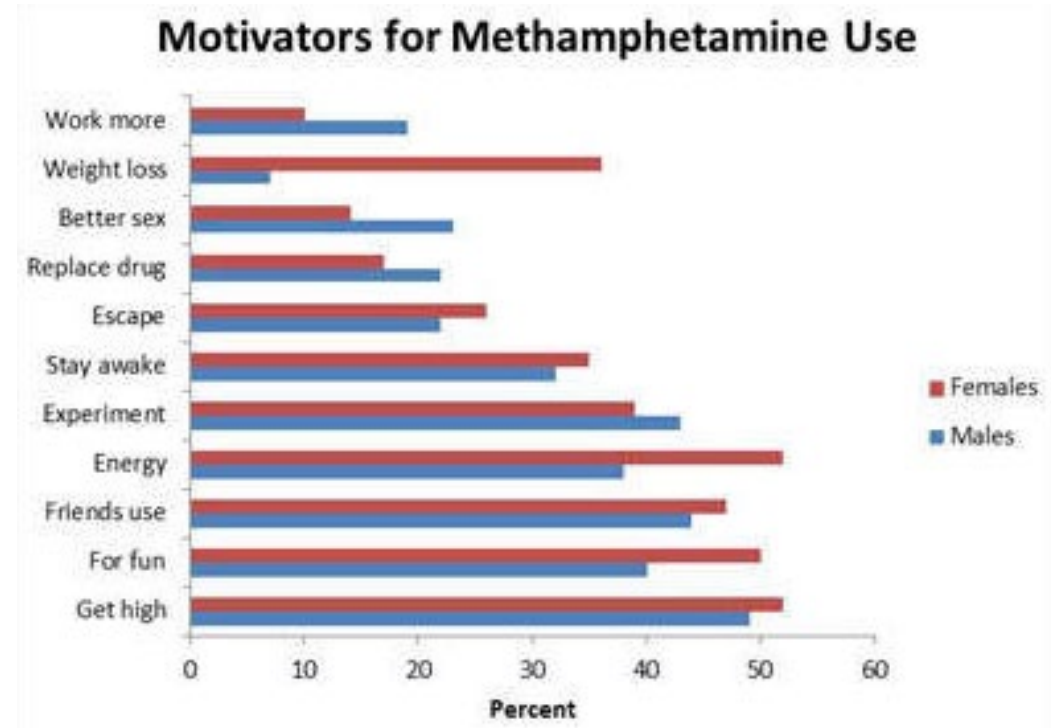
- Women move from first use to addiction faster than men, called **telescoping**.

Figure 1. Telescoping Effects by Gender and type of Progression  
(adapted from Slutske et al., 2015)



# Sex/Gender and Methamphetamine Use

- **Earlier age** at initiation
- Initiate with sexual partner
- **Weight Loss**
  - 36 women vs 7% men of women
  - Trigger postpartum
- **Energy**
  - 52 women vs 38% men
  - Caregiver roles

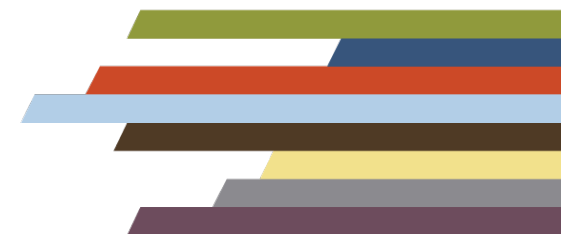
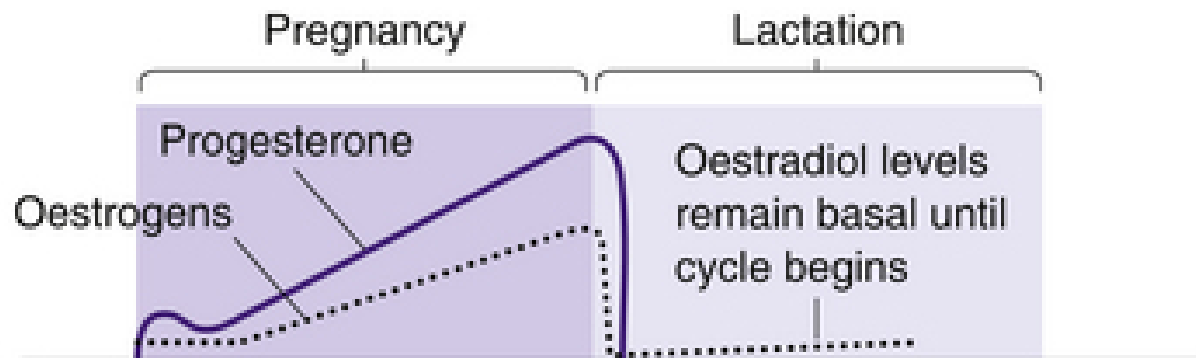
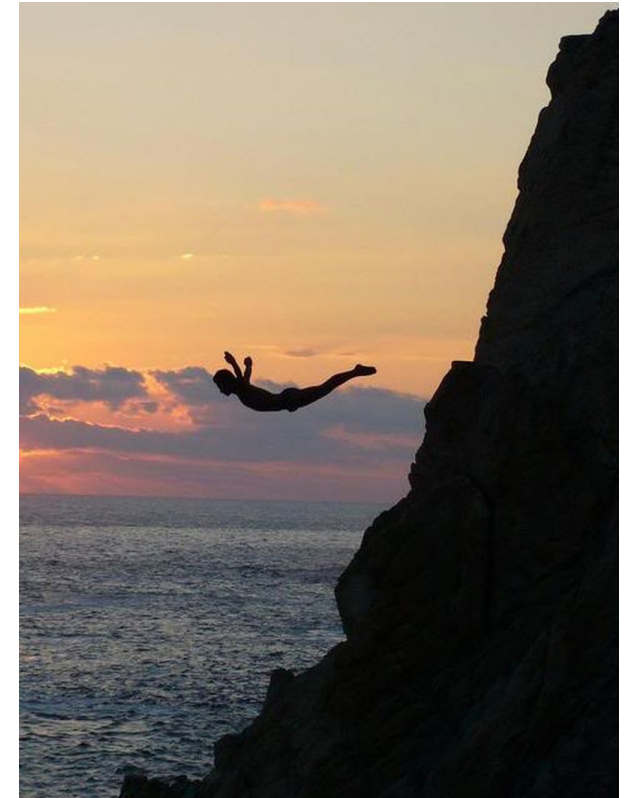


Methamphetamine use behaviors and gender differences

Mary-Lynn Brecht<sup>a,\*</sup>, Ann O'Brien<sup>a</sup>,  
Christina von Mayrhauser<sup>b</sup>, M. Douglas Anglin<sup>a</sup>

# Sex/Gender and Drug Use (pt. 2)

- In periods of abstinence, women have more cravings and relapse than men
- **Hormonal sensitivity**
  - Estrogen may impact dopamine signaling
  - Higher levels of progesterone (compared to estrogen) less likely to relapse and fewer cravings
  - Pregnancy and postpartum – hormonal tornado

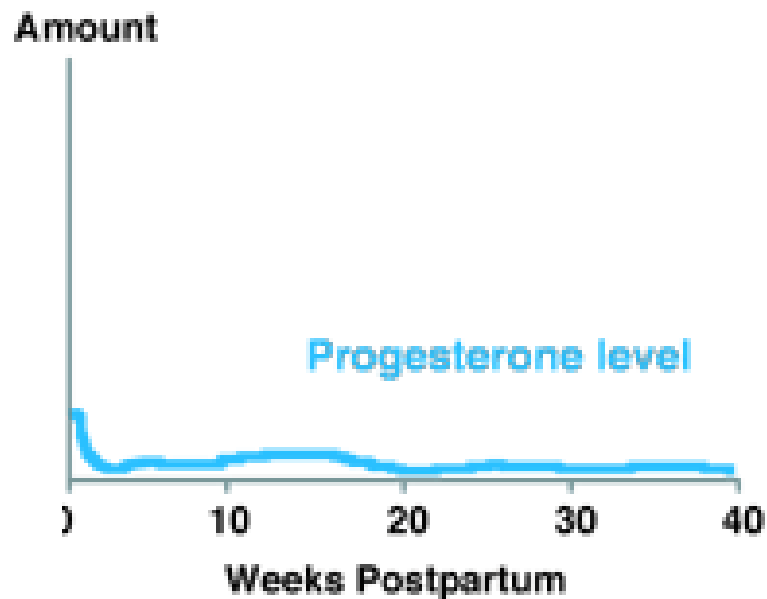


# Sex and Gender Differences in Addiction

- Low levels of progesterone in breastfeeding

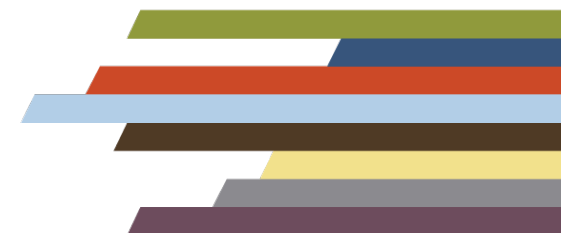
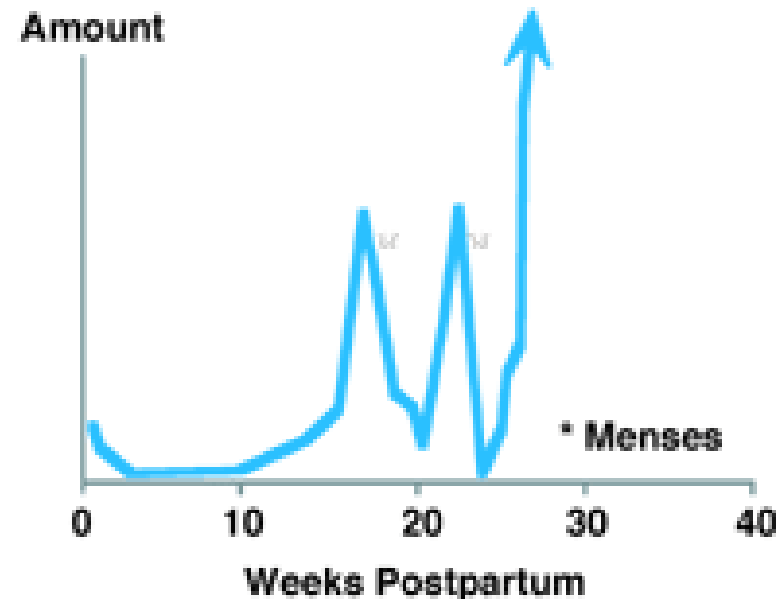
## Effective Protection

Intensive Breastfeeding



## Ineffective Protection

Infrequent Breastfeeding



# Pregnancy as Opportunity

- **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 Forray<sup>1</sup>, Brian Merry<sup>1</sup>, Haiqun Lin<sup>2</sup>, Jennifer Prah Ruger<sup>3</sup>, and Kimberly A. Yonkers<sup>1,2,4</sup>

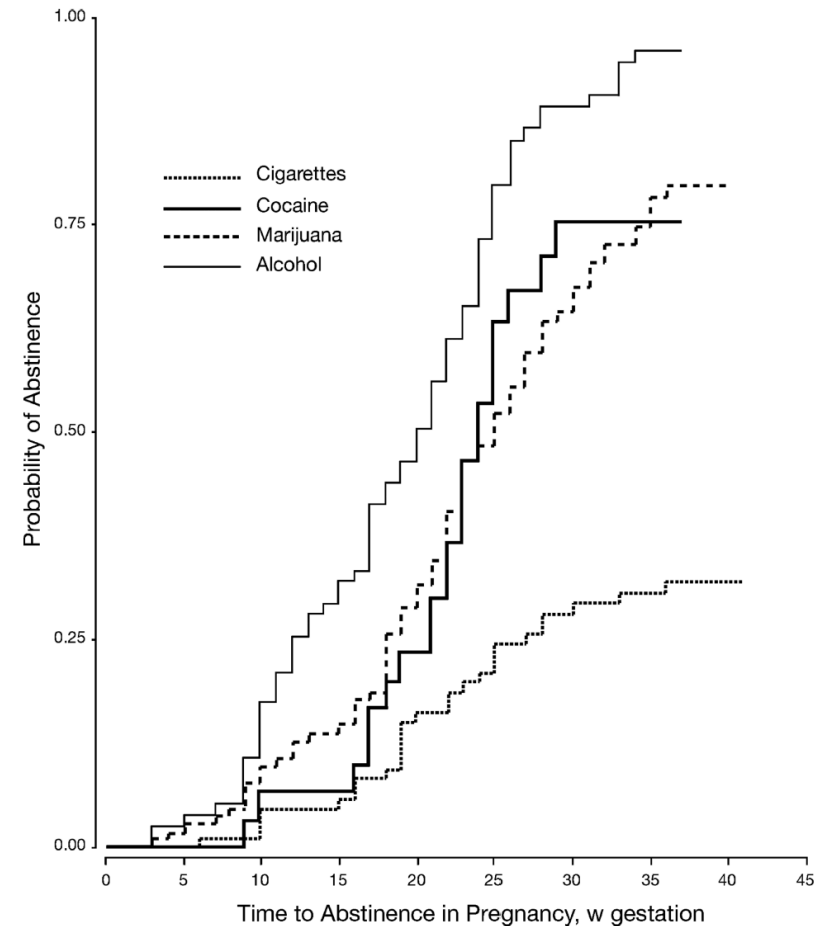


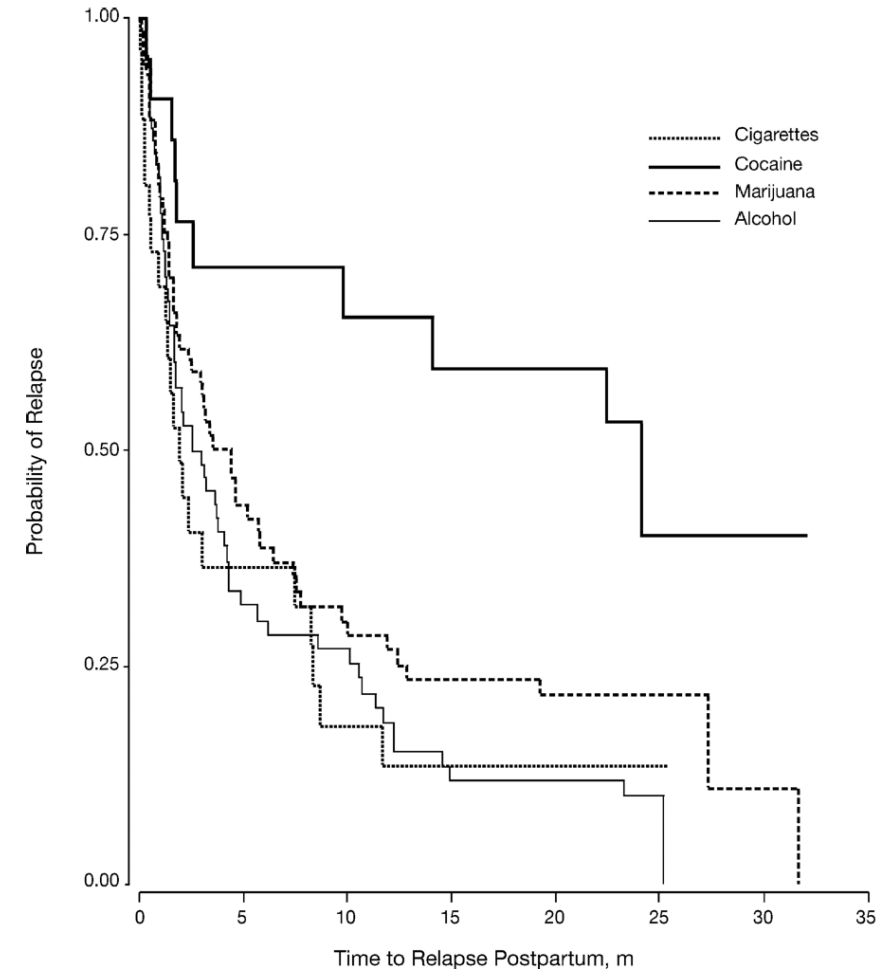
Figure 2. Time to Abstinence in Pregnancy by Drug  
Kaplan-Meier estimates of the time interval in pregnancy (weeks in pregnancy) to abstinence from cigarettes, alcohol, marijuana or cocaine.

# Abstinence and Relapse

- 80% of women who were abstinent in last month of pregnancy, **relapsed to at least one substance with year postpartum.**

## Perinatal Substance Use: A Prospective Evaluation of Abstinence and Relapse

Ariadna Forray<sup>1</sup>, Brian Merry<sup>1</sup>, Haiqun Lin<sup>2</sup>, Jennifer Prah Ruger<sup>3</sup>, and Kimberly A. Yonkers<sup>1,2,4</sup>



**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.

# Pregnancy Associated Death

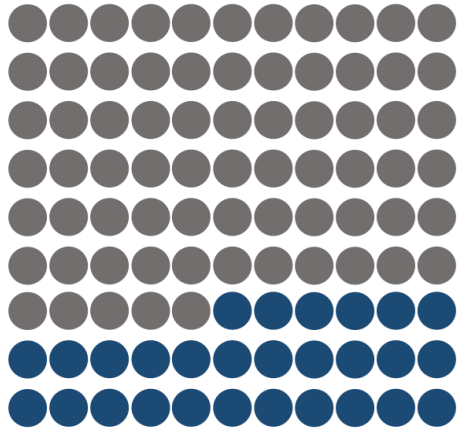
Maternal Morbidity and Mortality: *Original Research*

## Pregnancy-Associated Death in Utah

*Contribution of Drug-Induced Deaths*

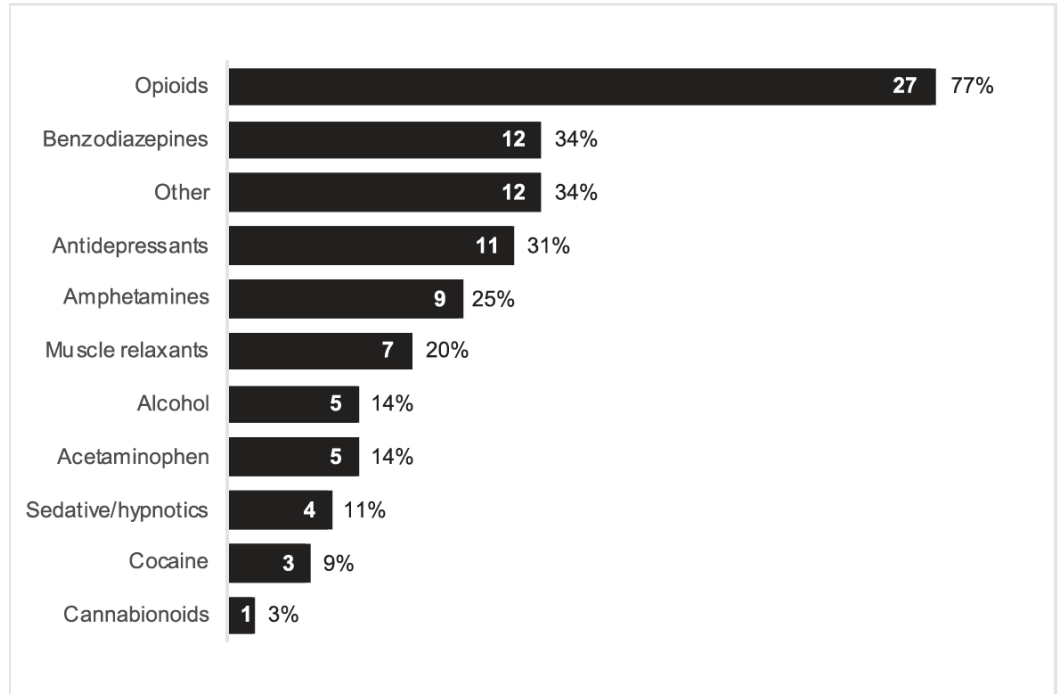
*Marcela C. Smid, MD, Nicole M. Stone, MPH, Laurie Baksh, MPH, Michelle P. Debbink, MD, PhD, Brett D. Einerson, MD, Michael W. Varner, MD, Adam J. Gordon, MD, and Erin A. S. Clark, MD*

### Pregnancy Associated Deaths



**26%**

**Of all deaths were drug-related**



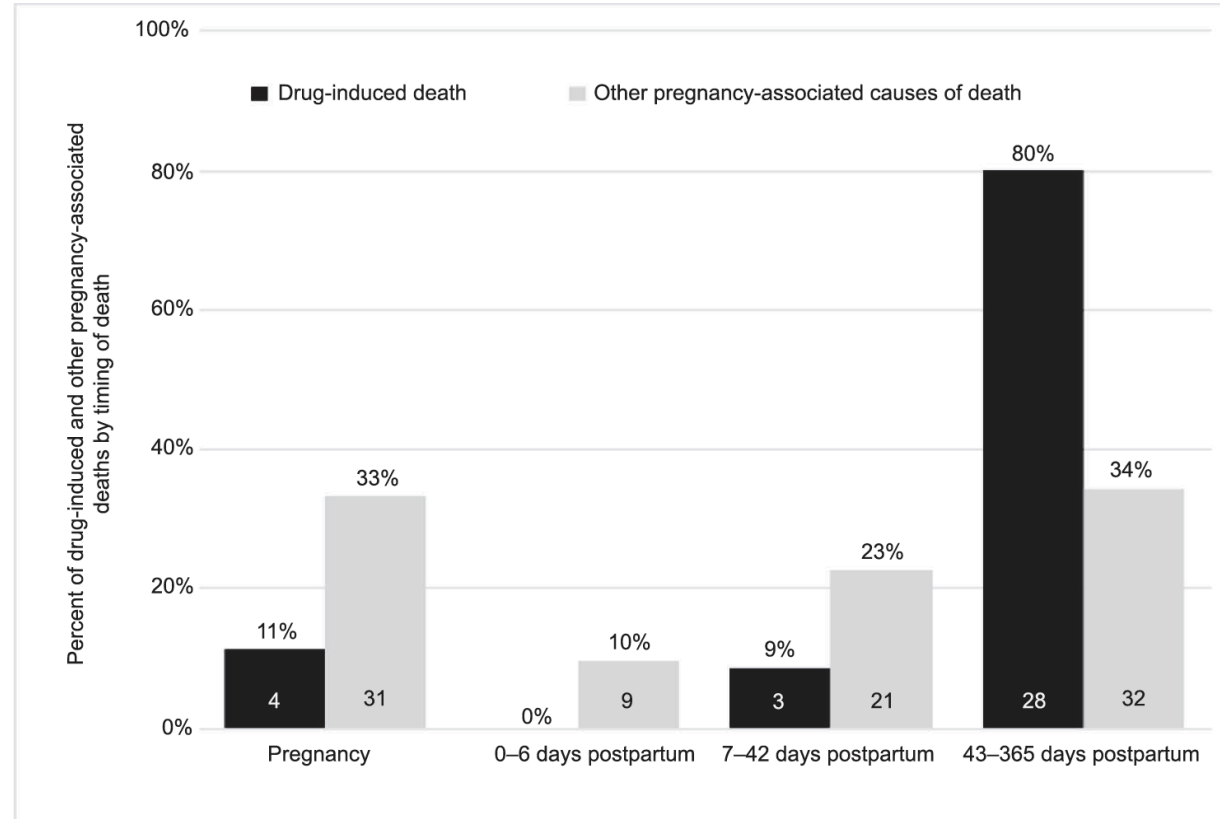
# Pregnancy Associated Death (pt. 2)

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

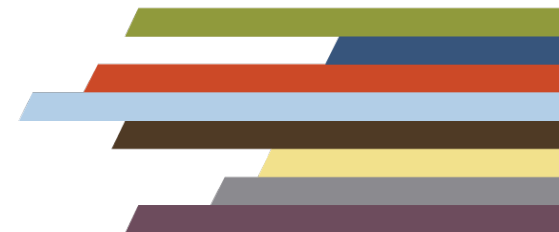


**Fig. 1.** Proportion of pregnancy-associated, drug-induced deaths vs all pregnancy-associated deaths 2005–2014 (N=136). Smid. *Pregnancy-Associated Drug-Induced Deaths in Utah. Obstet Gynecol* 2019.



# The Question: Is my baby going to get taken away?

- **Fear**
  - Discovery, prosecution
  - Losing children
  - Treatment
  - Disapproval, stigma
- **Other Barriers**
  - Transportation
  - Childcare
- Increase subsequent pregnancy rates
- “I have a hole in my heart from missing those two months with my son. **It makes me want to have another baby to fill it.**”



# State Law

AS OF SEPTEMBER 1, 2019

STATE LAWS AND POLICIES



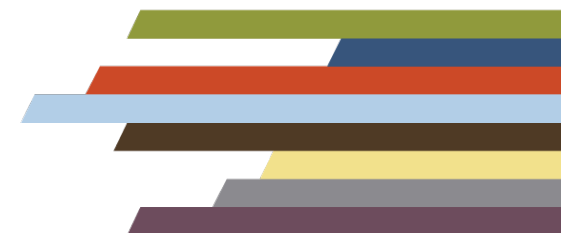
## Substance Use During Pregnancy

### State Policies On Substance Use During Pregnancy

STATE	SUBSTANCE USE DURING PREGNANCY CONSIDERED:		WHEN DRUG USE SUSPECTED, STATE REQUIRES:		DRUG TREATMENT FOR PREGNANT WOMEN		
	Child Abuse	Grounds For Civil Commitment	Reporting	Testing	Targeted Program Created	Pregnant Women Given Priority Access In General Programs	Pregnant Women Protected From Discrimination In Publicly Funded Programs
Utah	X		X			X	
Montana			X				

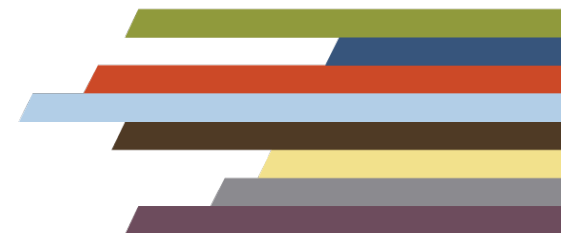


<https://www.guttmacher.org/state-policy/explore/substance-use-during-pregnancy>



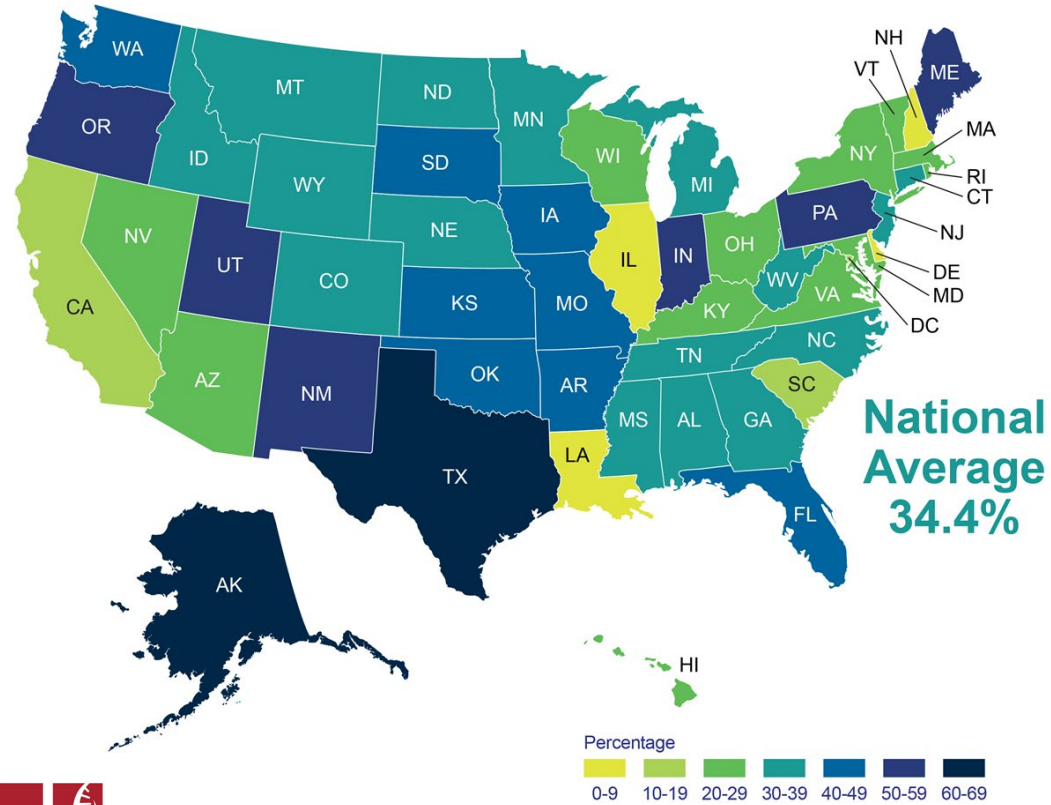
# Ethical Question

- ♦ Should we punish women who “cause their babies harm” by using drugs?
  - ♦ Should we punish women who do not control blood sugars or take hypertensive medications?
- ♦ Should we routinely take away babies of mothers who test positive for drugs?
  - ♦ Should we routinely take away babies of mothers who smoke? Who are addicted to cell phones?



# Drug Epidemic and Child Welfare

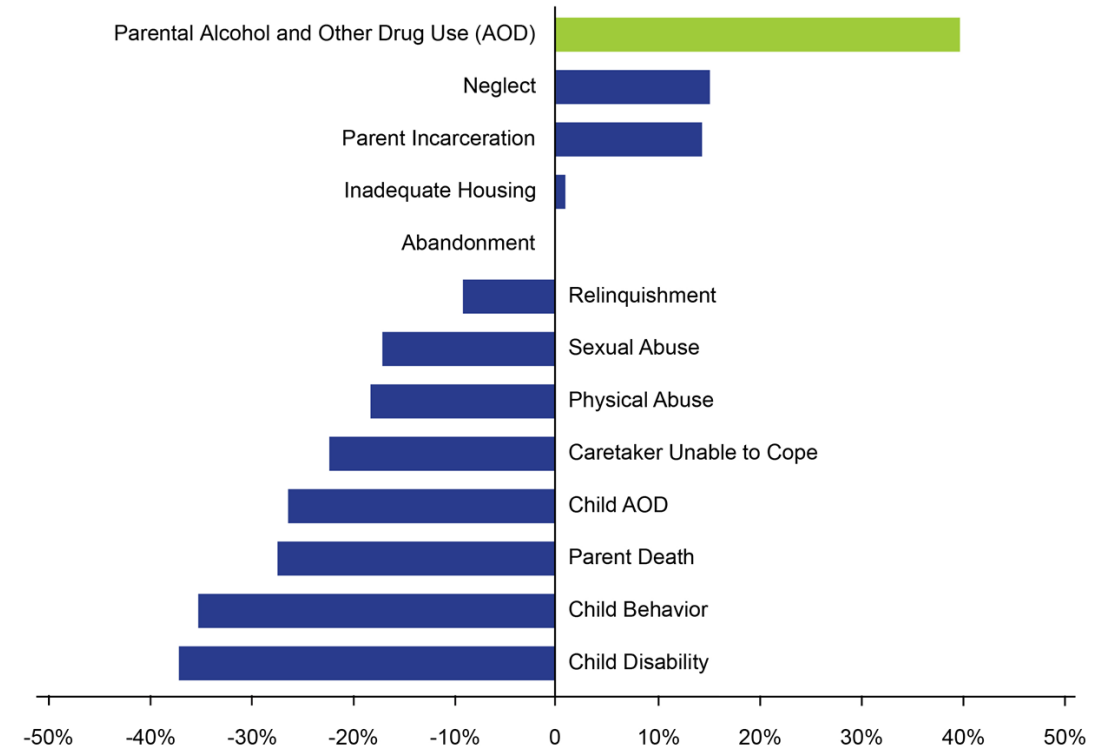
Parental Alcohol or Other Drug Use as Reason for Removal by State, 2015



11 children in out-of-home care at some point during Fiscal Year.

Source: AFCARS Data, 2016

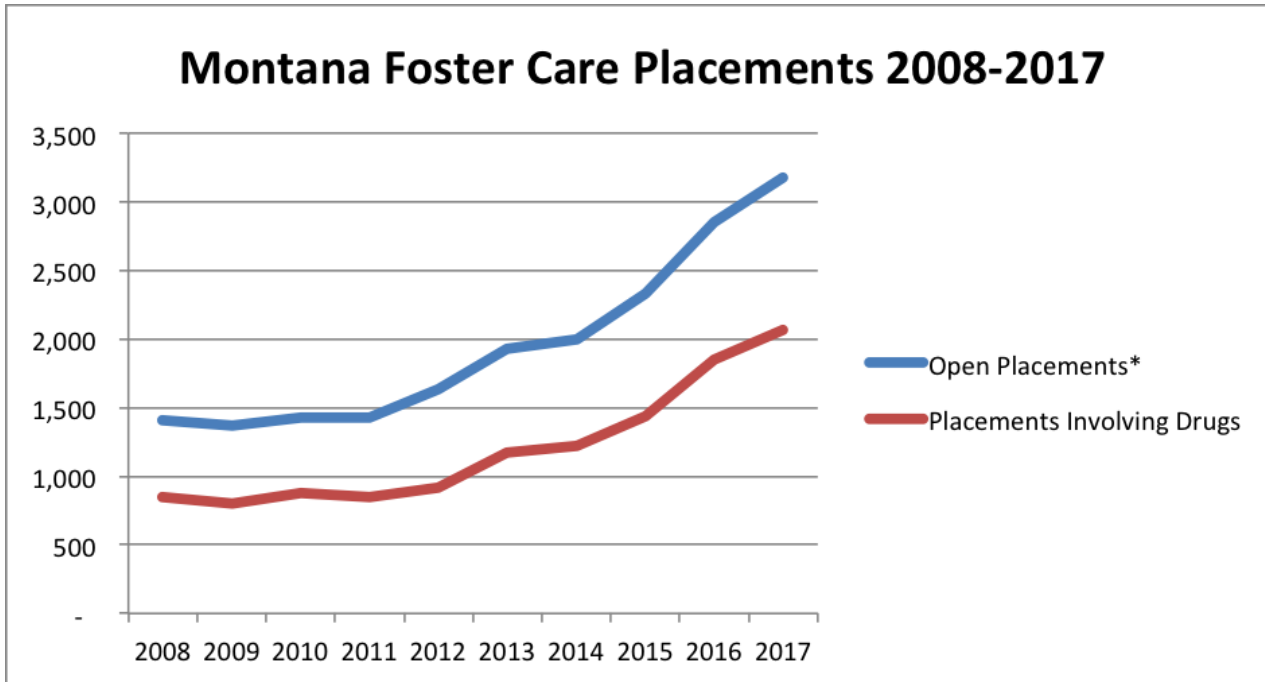
Percentage Change in Reasons for Removal in the United States, 2009 to 2015



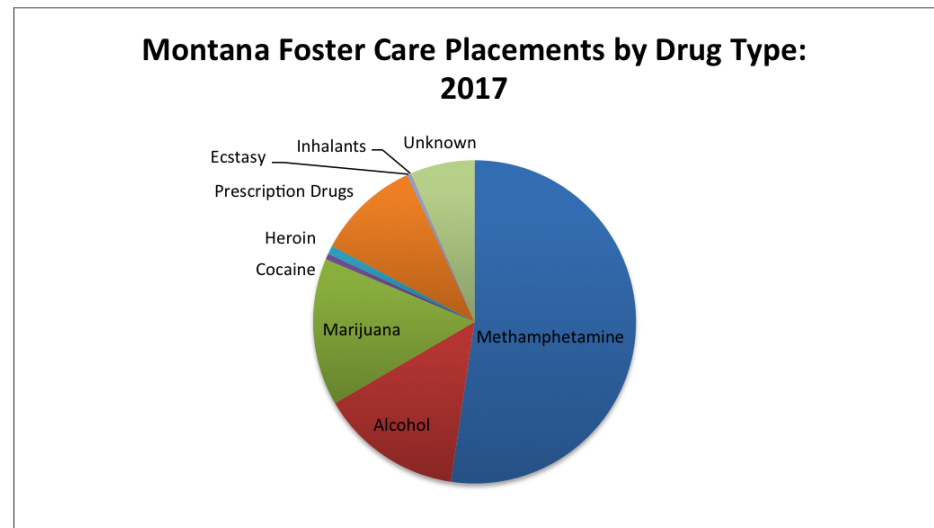
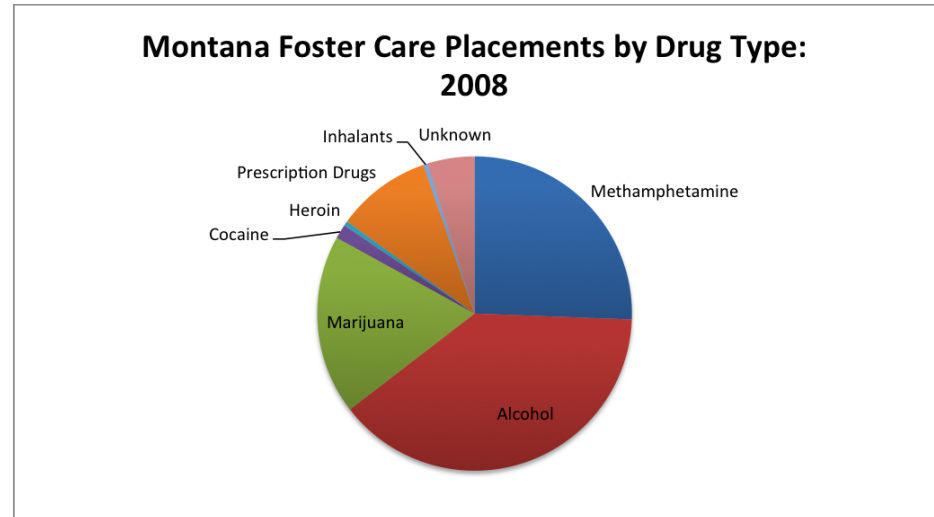
Source: AFCARS Data, 2010-2016



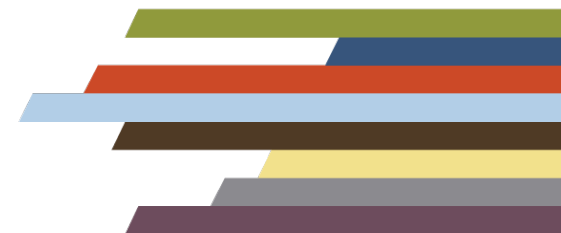
# Methamphetamine and Child Welfare



Source: Montana Department of Public Health & Human Services, Child & Family Services Division CAPS Report 5388.2 (updated 02/18/2017). \*Open placement counts exclude tribal placements. \*Open Placement Counts exclude Tribal Placements.



# Methamphetamines

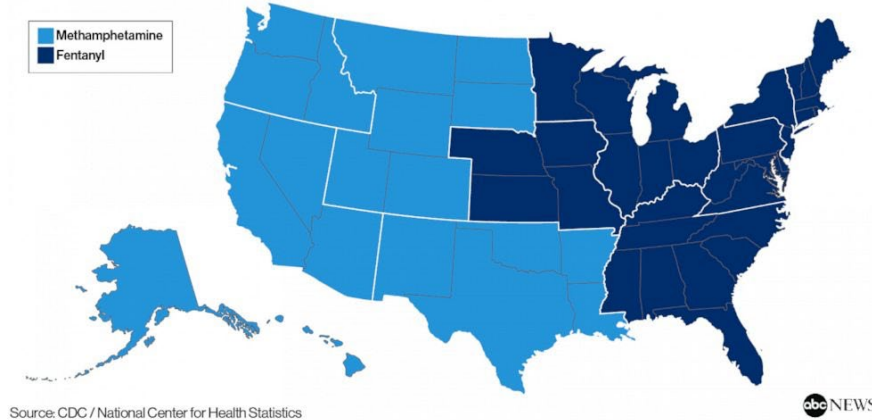


# The New Old Epidemic

“Nearly 100 percent pure and about \$5 a hit, the new meth is all the more difficult for users to resist.”



DRUG OVERDOSE DEATH RATES FOR FENTANYL AND METHAMPHETAMINE



*Meth, the Forgotten Killer, Is Back. And It's Everywhere.*

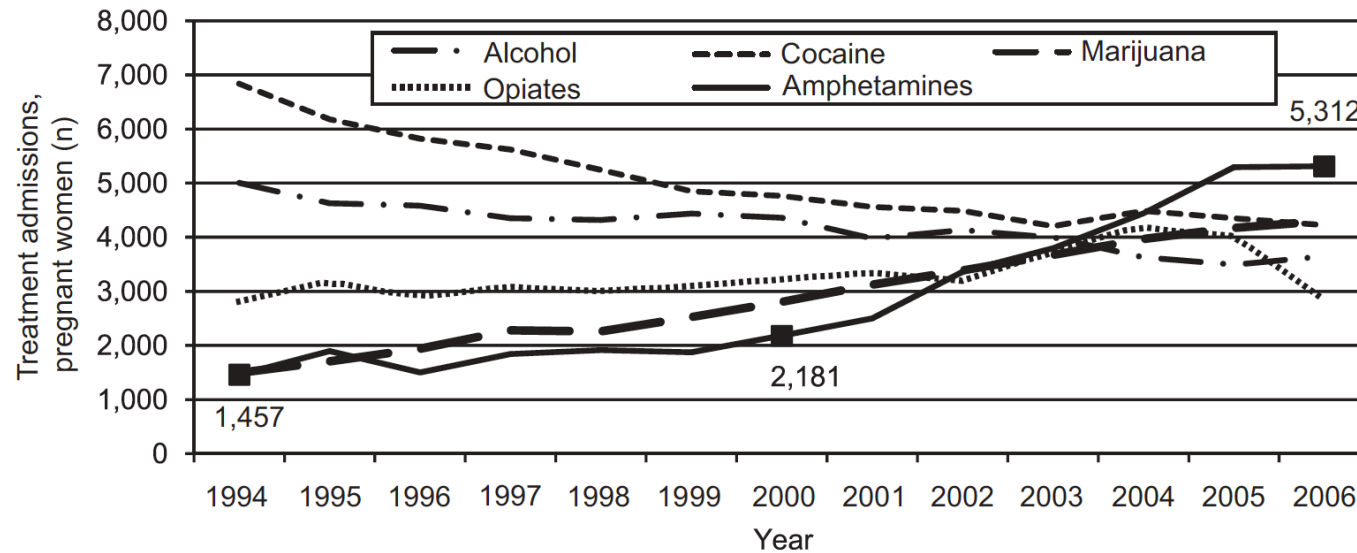
By FRANCES ROBLES FEB. 11, 2018



# Pregnancy and Methamphetamines

## Methamphetamine Use Among Pregnant Women

Mishka Terplan, MD, MPH, Erica J. Smith, MPH, Michael J. Kozloski, MA, MS,  
and Harold A. Pollack, PhD

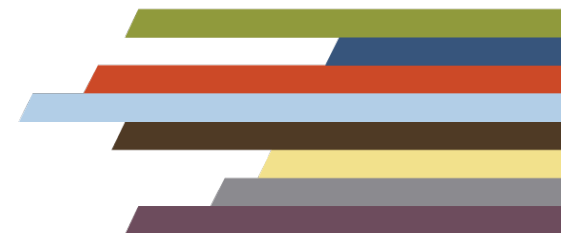


**Fig. 1.** Primary substance among pregnant women in substance treatment. Terplan. *Methamphetamine Treatment Among Pregnant Women. Obstet Gynecol* 2009.



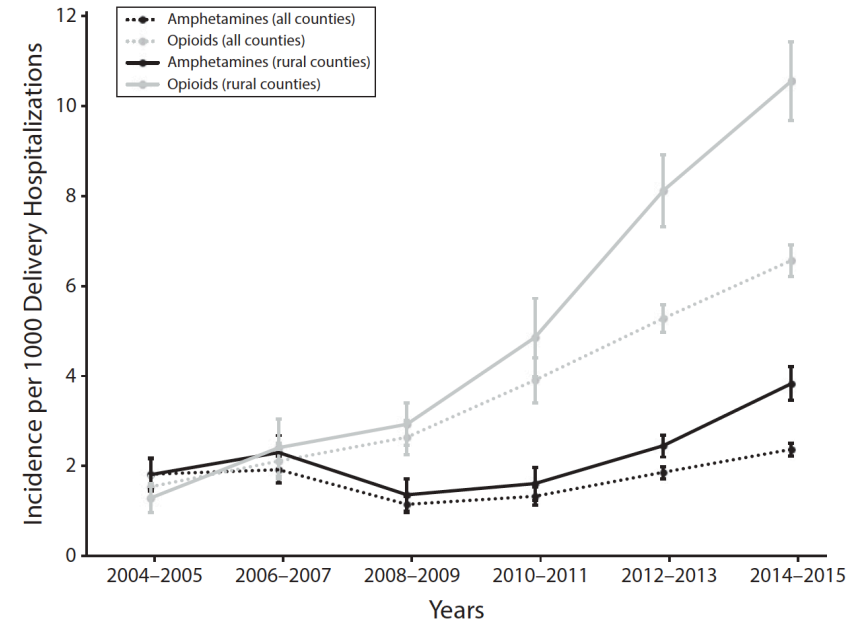
# Methamphetamine and Native Populations

- National Longitudinal Study of Adolescent Health (N=14,332; 18–26-year-olds)
- **12.8% of Native American youth** had used methamphetamine in the past year
- 3.3% White
- 0.6% African American
- 1.9% Hispanic
- 1.8% Asian
- [Iritani, Hallfors et al., 2007†](#)



# Pregnancy and Methamphetamine

- 0.2% of deliveries between 2004-2015 were affected by amphetamine use
- Amphetamines and opioid deliveries increased disproportionately in rural versus urban counties
- 1% deliveries in rural West complicated by amphetamines use
- 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, MS; Gavin Bart, MD, PhD; Katy B. Kozhimannil, PhD, MPA; Caroline R. Richardson, MD; Vanessa K. Dalton, MD, MPH; and Tyler N. A. Winkelman, MD, MS

# Pregnancy and Methamphetamines (pt. 2)

- Complicated by poor prenatal care/poor pregnancy dating

## Obstetrical outcomes

- Severe preeclampsia
- IUGR
- Maternal cardiac problems/pulmonary edema
- Abruption-more with cocaine
- Preterm Labor

## 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

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  $\chi^2$  test.

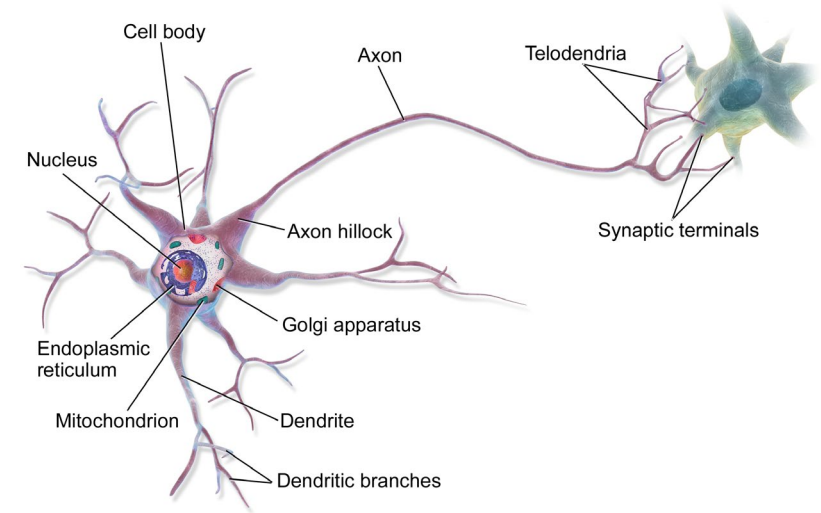
Table 2. Perinatal Outcomes

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  $\chi^2$  test.

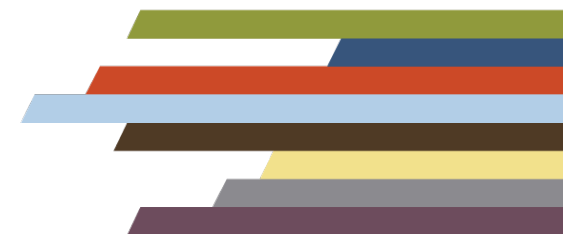
# Fetal and Infant Outcomes

- Methamphetamines are **neurotoxic**
  - Preferential concentration of metabolites in the fetal brain.
  - Earlier exposure is associated with longer lasting alteration in the serotonergic pathways .
  - Sex differences in methamphetamine exposure may start in the fetal period.
- Male offspring increased risk of **drug-induced neurotoxicity as adults.**
- While not correlated with functional differences, methamphetamine-exposed female children had **changes in frontal white matter suggestive of altered neuronal and glial development.**



# Fetal and Infant Outcomes: Sex Differences

- Male offspring increased risk of **drug-induced neurotoxicity as adults.**
- While not correlated with functional differences, methamphetamine-exposed female children had **changes in frontal white matter suggestive of altered neuronal and glial development.**



# 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.

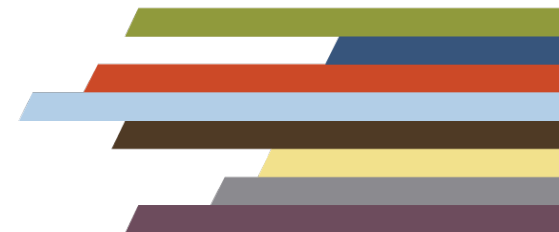


# IDEAL: Neonatal and child outcomes

- Neonatal outcomes
  - Increased admission to the NICU
  - Decreased arousal and increased physiological stress
  - **Improved at one month of age.**
- Early childhood outcomes,
  - **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 ( $\geq 3$  days per week), increased anxiety/depression and attention problems
- Childhood outcomes
  - At age 7.5 years had poorer cognitive function on the Conner's Parent Rating Scale, but not behavioral problems



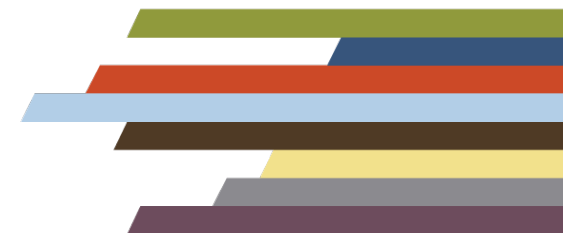
# Approaches to Treatment





# Traditional Approaches to Addiction in Pregnant Women

- Approach #1: Call Child Protective services -women with addiction not fit to parent. Removal of custody.
- Approach #2: Arrest her. Then she'll stay clean at least while she's in jail. Baby won't be affected.
- Approach #3: Arrest her. Make enrollment in drug treatment a condition of discharge.



# Lessons Learned from South Carolina

- In 1997, Cornelia Witner was prosecuted for child abuse for using crack-cocaine during pregnancy.
- State Supreme Court upheld her conviction.
- Tested without her knowledge or consent.
- After her prosecution:
  - Admissions to drug-treatment **dropped by 80%**.
  - Increase in infant mortality.
  - **20% increase in abandoned infants**



Whitner v. State  
S.C.,1997.

Supreme Court of South Carolina.  
Cornelia WHITNER, Respondent,  
v.  
STATE of South Carolina, Petitioner.  
No. 24468.

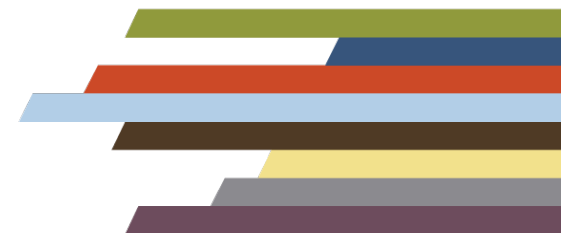
The Guttmacher Report on Public  
Policy. December, 2000

# Incarceration

- In most prison, **less than 5% of women** get mental health care, including substance abuse treatment.
  - Women in prison often don't get adequate prenatal care.
- Women in prison are subjected to abuse, inadequate nutrition, and increased stress, all of which increase pregnancy complications.
- Treatment is **much cheaper** than prison

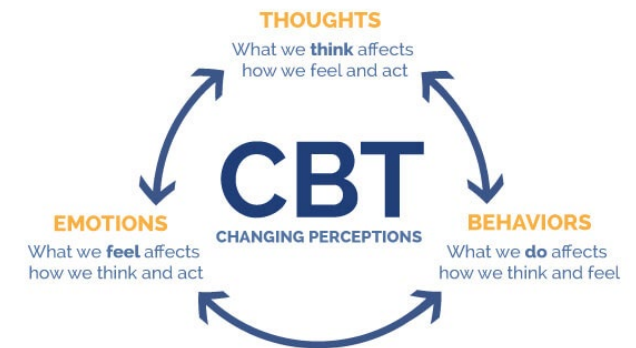


Beck & Maruschak, 2001



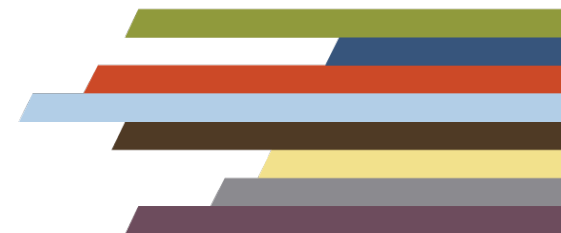
# Family-oriented and Gender Specific Treatment

- **Trauma-centered care**
  - Extremely high rates of childhood sexual trauma in these women
- Because women are much more relationship oriented, may not want residential treatment if separated from children.
  - Needs to provide childcare/transportation
- **Behavioral treatment**
  - Cognitive-behavioral therapy (CBT)
  - Contingency management, or motivational incentives
  - The Matrix Model
  - 12-Step facilitation therapy
  - Mobile medical application: reSET®



# Postpartum

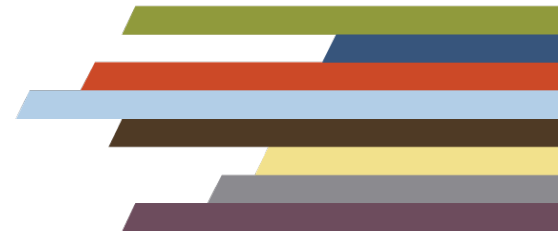
- **Grief and support counseling for non-parenting mothers**
  - Acknowledgement of loss
- **Peer support**
- **Non-judgmental language**
  - Person centered language
  - NOT clean or dirty – expected or unexpected
  - Discuss relapse and safety plans
- **Harm reduction**
  - Peer support
  - Relapse prevention
  - Relapse discussion
  - Extremely high suicide risk



# Questions?



[Marcela.Smid@hsc.utah.edu](mailto:Marcela.Smid@hsc.utah.edu)



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