

# Drug related and suicide deaths: pregnancy related criteria

## *Montana MMRC*



**Marcela Smid**  
Maternal Fetal Medicine  
Addiction Medicine



# DISCLOSURE



- Medical advisory committee for Gilead Science Inc. for hepatitis C treatment for pregnant and postpartum women
- Funded by the NIH K12 Women's Reproductive Health Research grant 2018-2020



# OBJECTIVES

- Celebrate Montana's FIRST MMRC MEETING
- Proposed pregnancy-related versus pregnancy-associated drug-related deaths and suicides

# CONGRATULATIONS





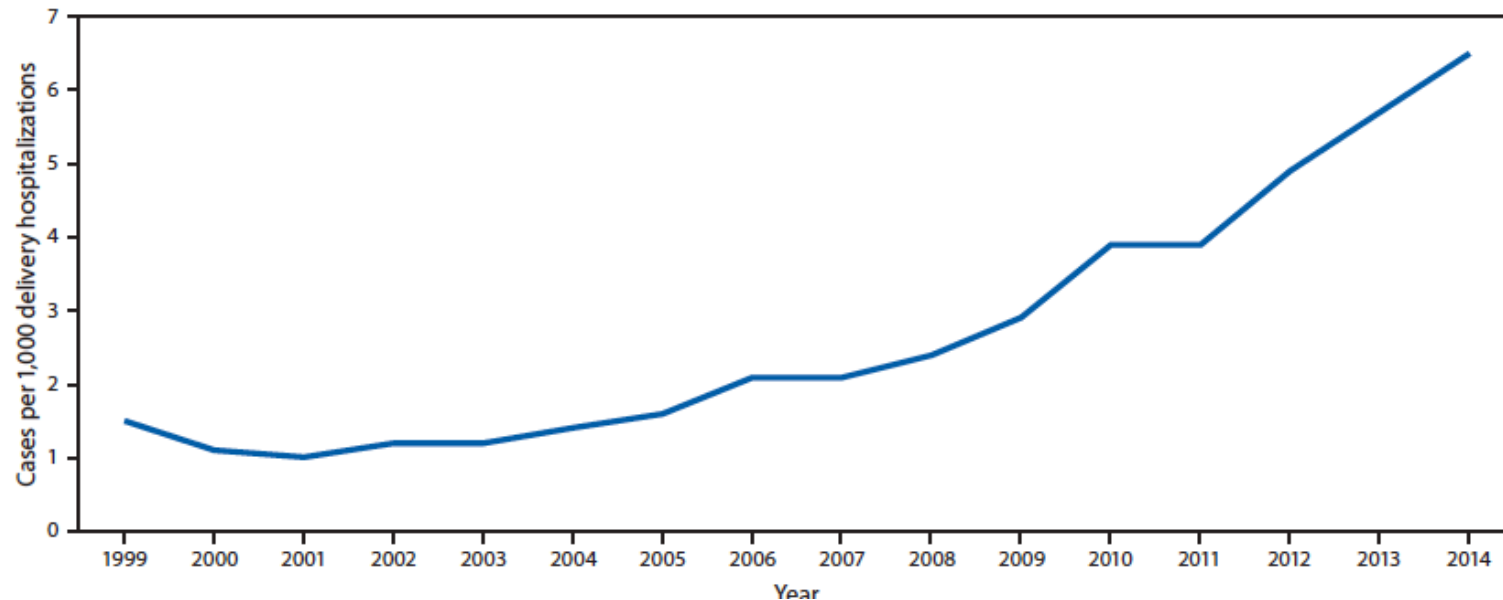
# CONGRATULATIONS



# PREGNANCY AND OPIOID USE DISORDER

- Rates of pregnancy complicated by opioid use disorder **quadrupled** 1999-2014 (Haight et al 2018)

FIGURE 1. National prevalence of opioid use disorder per 1,000 delivery hospitalizations\* — National Inpatient Sample (NIS),<sup>†</sup> Healthcare Cost and Utilization Project (HCUP), United States, 1999–2014



## Opioid Use Disorder Documented at Delivery Hospitalization — United States, 1999–2014

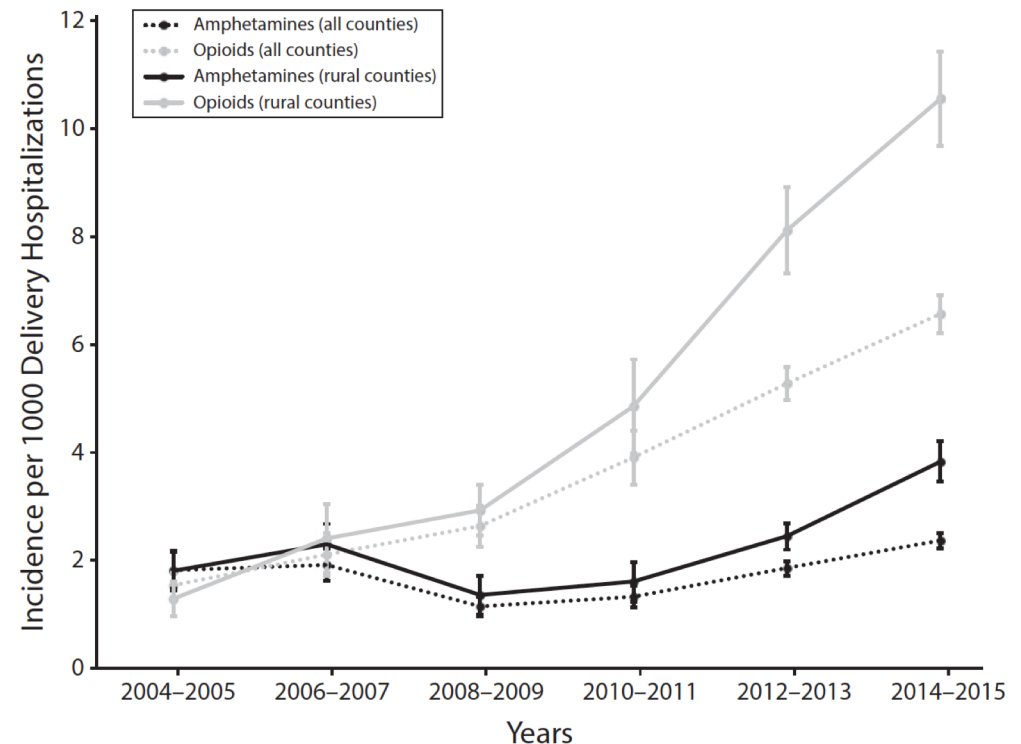
Sarah C. Haight, MPH<sup>1,2</sup>; Jean Y. Ko, PhD<sup>1,3</sup>; Van T. Tong, MPH<sup>1</sup>; Michele K. Bohm, MPH<sup>4</sup>; William M. Callaghan, MD<sup>1</sup>

# PREGNANCY AND METHAMPHETAMINE

## 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

- 0.2% of deliveries between 2004-2015 were affected by amphetamine use
- Rural counties
  - **1% deliveries in rural West** complicated by amphetamines use
  - **5.2% in highest use areas**

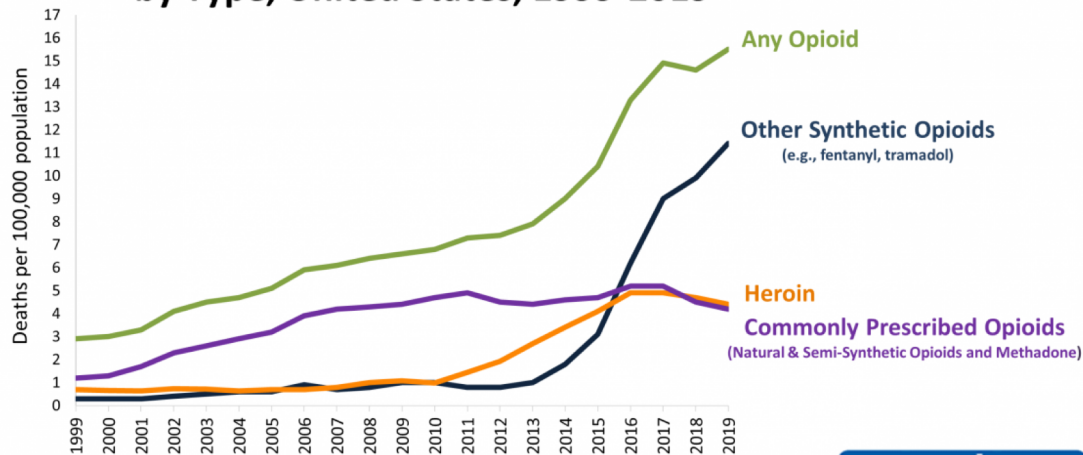


*Note.* The sample size was  $n = 47\,164\,263$ . All data are survey-weighted and represented as rate per 1000 delivery hospitalizations. Whiskers indicate 95% confidence intervals.

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

# OPIOID AND METHAMPHETAMINE RELATED OVERDOSE EPIDEMIC

**Overdose Death Rates Involving Opioids,  
by Type, United States, 1999-2019**

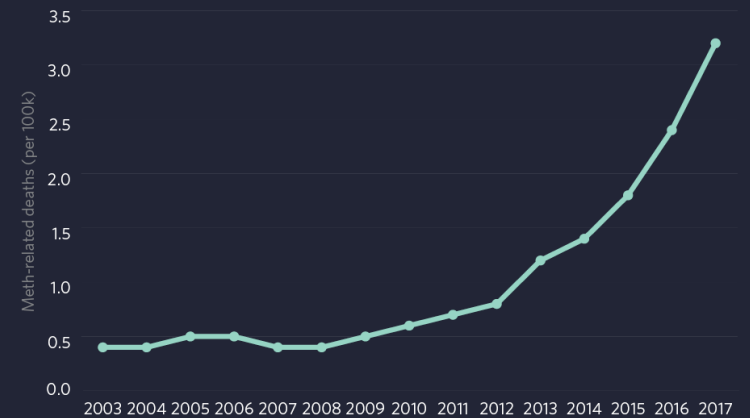


SOURCE: CDC/NCHS, National Vital Statistics System, Mortality. CDC WONDER, Atlanta, GA: US Department of Health and Human Services, CDC; 2020. <https://wonder.cdc.gov/>.

[www.cdc.gov](http://www.cdc.gov)  
Your Source for Credible Health Information

## Rise in Meth-Related Deaths

Nationwide, methamphetamine-related overdose deaths are skyrocketing. Although opioid-involved overdoses kill far more people, meth-related deaths are increasing much faster than opioids did at the start of the opioid epidemic.



Note: Overdose deaths do not include cocaine-related deaths but do include a fraction of deaths involving other psychostimulants (such as MDMA, dextroamphetamine, levoamphetamine, Ritalin and caffeine).

Sources: National Vital Statistics System, Mortality File, CDC WONDER

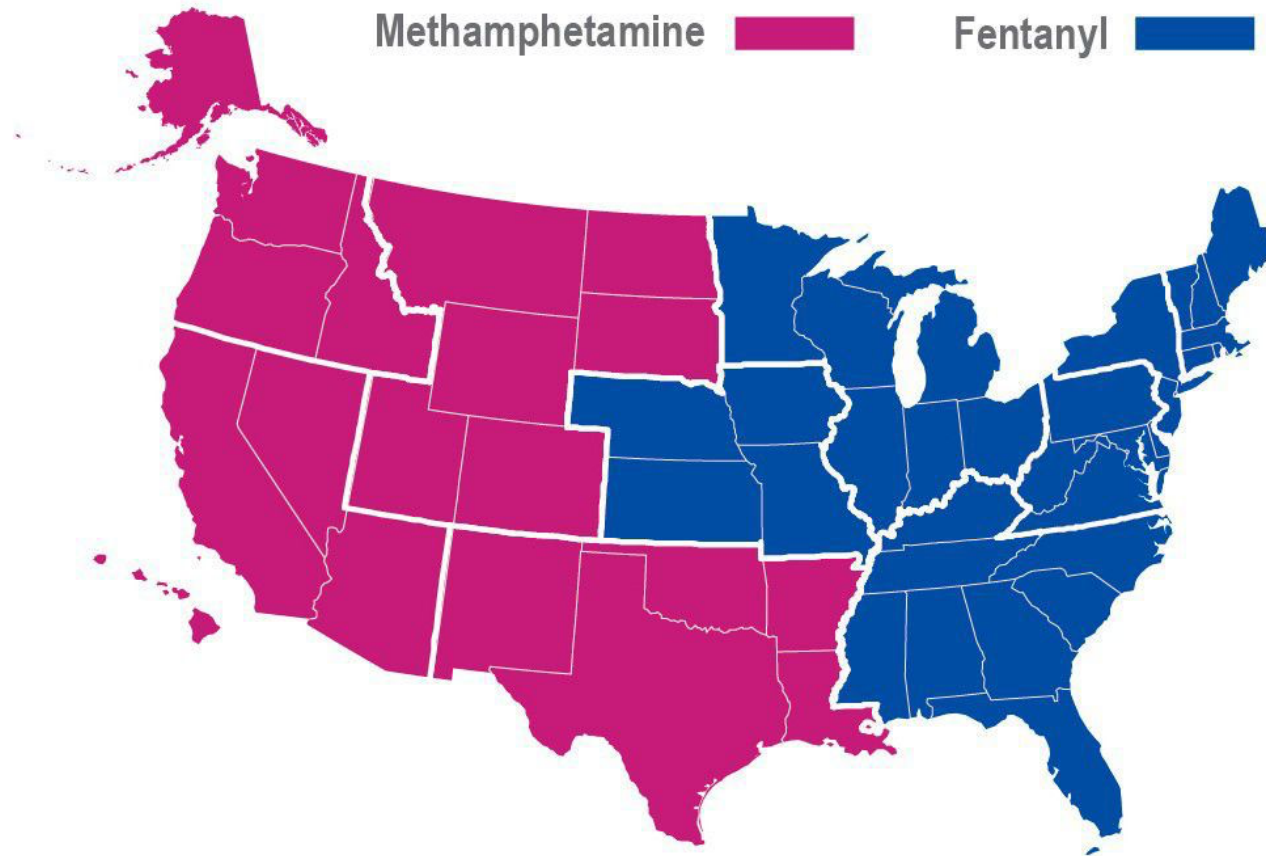
© 2019 The Pew Charitable Trusts



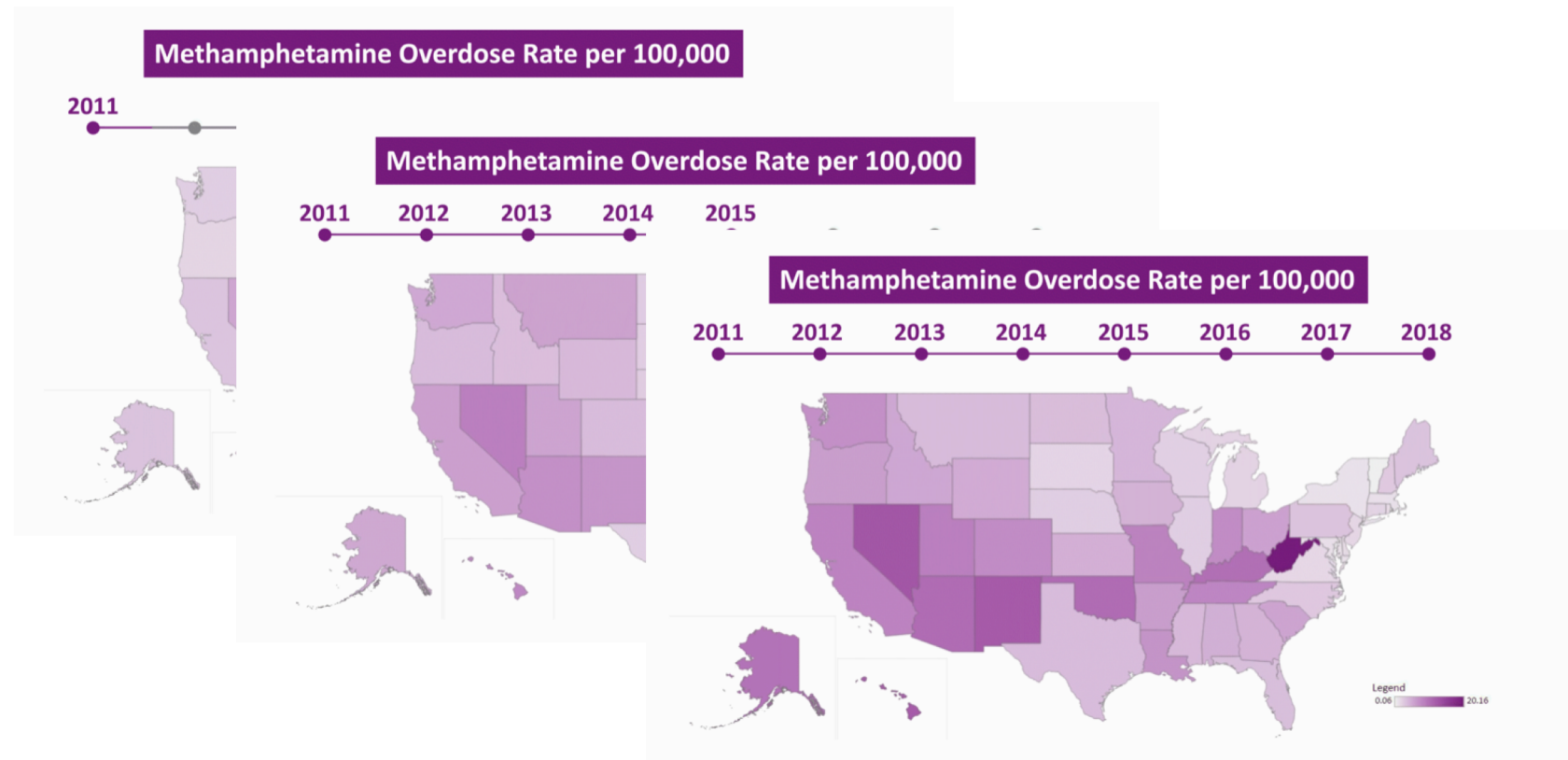
# OPIOID AND METHAMPHETAMINE RELATED OVERDOSE EPIDEMIC

## Drug overdose deaths by region

Methamphetamine was the top drug involved in overdose deaths in most of the western half of the U.S. while fentanyl pervaded the eastern half.



# OPIOID AND METHAMPHETAMINE RELATED OVERDOSE EPIDEMIC



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

# METHAMPHETAMINE RELATED OVERDOSE

- 2015 → 2019 methamphetamine related deaths increased 180%
  - 5526 → 15489 deaths (p value test of trend)
- Methamphetamine use disorder
  - tripled among **heterosexual women** (0.24% → 0.74%,  $p < 0.01$ )
  - 10x's among **Black individuals** (0.06% → 0.64%,  $p = 0.07$ )

JAMA Psychiatry | [Original Investigation](#)

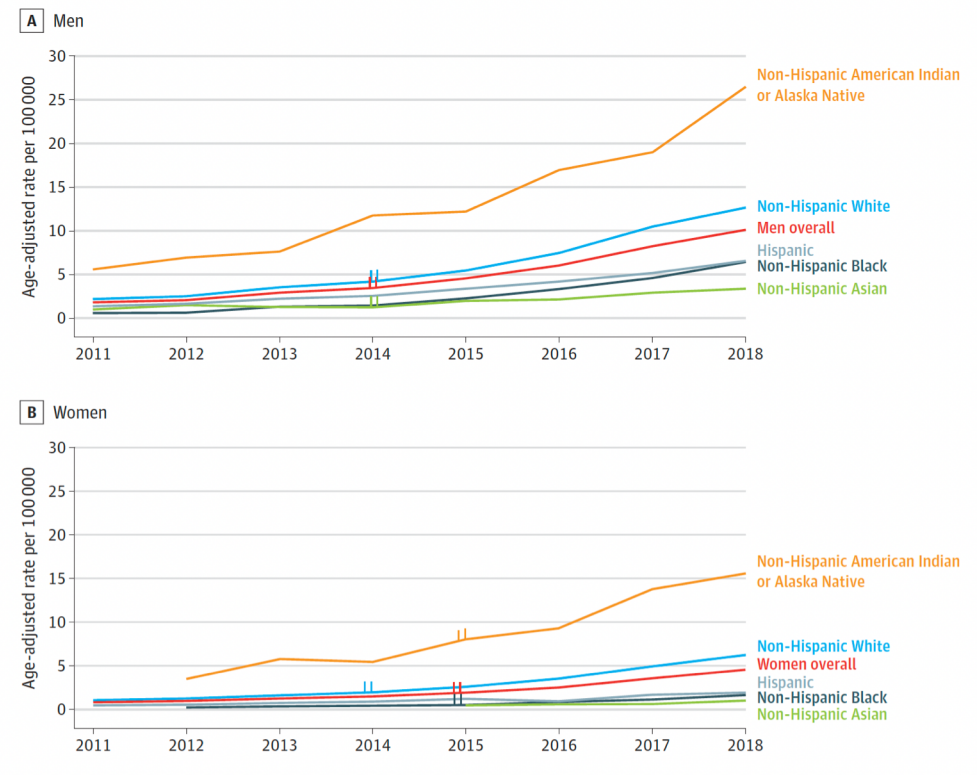
## Methamphetamine Use, Methamphetamine Use Disorder, and Associated Overdose Deaths Among US Adults

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

# METHAMPHETAMINE RELATED OVERDOSE

- Highest rates among Native Americans
- Accelerating rates for Native American women from 2015-2018
- Steady increase for Native American men 2011- 2018

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



# OPIOID AND METHAMPHETAMINE RELATED OVERDOSE EPIDEMIC

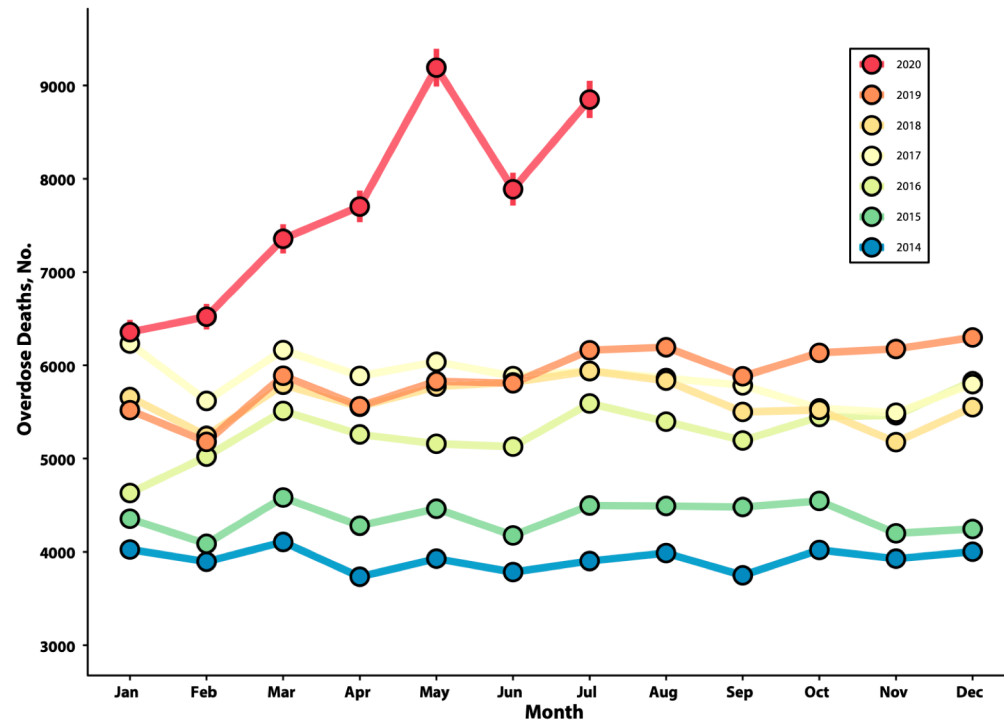


- **Fentanyl contamination**
  - 67% increase in methamphetamine tested positive for fentanyl
  - Cocaine deaths almost entirely fentanyl related; methamphetamine overdoses with no opioid involved also increasing
- **Combination of opioid use disorder and methamphetamine use disorder**
  - Idea that methamphetamine prevents overdose
  - Substitute methamphetamine when opioids harder to obtain
  - Synergistic high
  - "Help me function"
- **Combination enhances toxicity and lethality by exacerbating cardiovascular and pulmonary effects**

# OVERDOSE EPIDEMIC AND COVID

## COVID-19 and the Drug Overdose Crisis: Uncovering the Deadliest Months in the United States, January–July 2020

Joseph Friedman, MPH, and Samir Akre, BS



**FIGURE 1—** Monthly Overdose Deaths From January 2014 to July 2020: United States

Note. Overdose deaths in the United States are shown by month, from January 2014 to July 2020. For values in 2020, 95% prediction intervals are shown, recovered using the algorithm described in this analysis. This figure reveals that May 2020 was the deadliest month for overdose death in the United States in recent history, elevated above May 2019 by about 60%.

AJPH Published online ahead of print April 15, 2021

# SUICIDE EPIDEMIC

## AGE-ADJUSTED U.S. SUICIDE RATE 1907-2017

PER 100,000 PEOPLE



Source: U.S. Centers for Disease Control and Prevention. Created with Datawrapper.

# SUICIDE EPIDEMIC

## Suicide Facts & Figures: United States 2021

Suicide is a preventable public health problem and a leading cause of death in the United States. More investment in suicide prevention, education and research will help prevent the untimely deaths of thousands of Americans each year.

Research suggests **suicide** is a **leading cause** of **maternal death** in the

**1<sup>st</sup>** year  
following  
childbirth.<sup>1</sup>



Maternal **suicide deaths** are **more common** than maternal **deaths** caused by **postpartum hemorrhage** or **hypertensive disorders**.<sup>2</sup>



Suicide accounts for up to **20%** of **postpartum deaths**.<sup>3/4</sup>



Maternal **suicide** is **most frequently completed** between

**6 to 12**  
months  
postpartum.<sup>5</sup>



The severity and rapidly evolving nature of **postpartum psychosis** **increases the risk** of maternal **suicide**.<sup>6</sup>



**Depression** during pregnancy greatly **increases thoughts** about suicide **while pregnant**.<sup>4</sup>



Learn more and find citation information at: [2020mom.org/maternal-suicide](https://2020mom.org/maternal-suicide)



[2020Mom.org](https://2020mom.org)



# SUICIDE EPIDEMIC

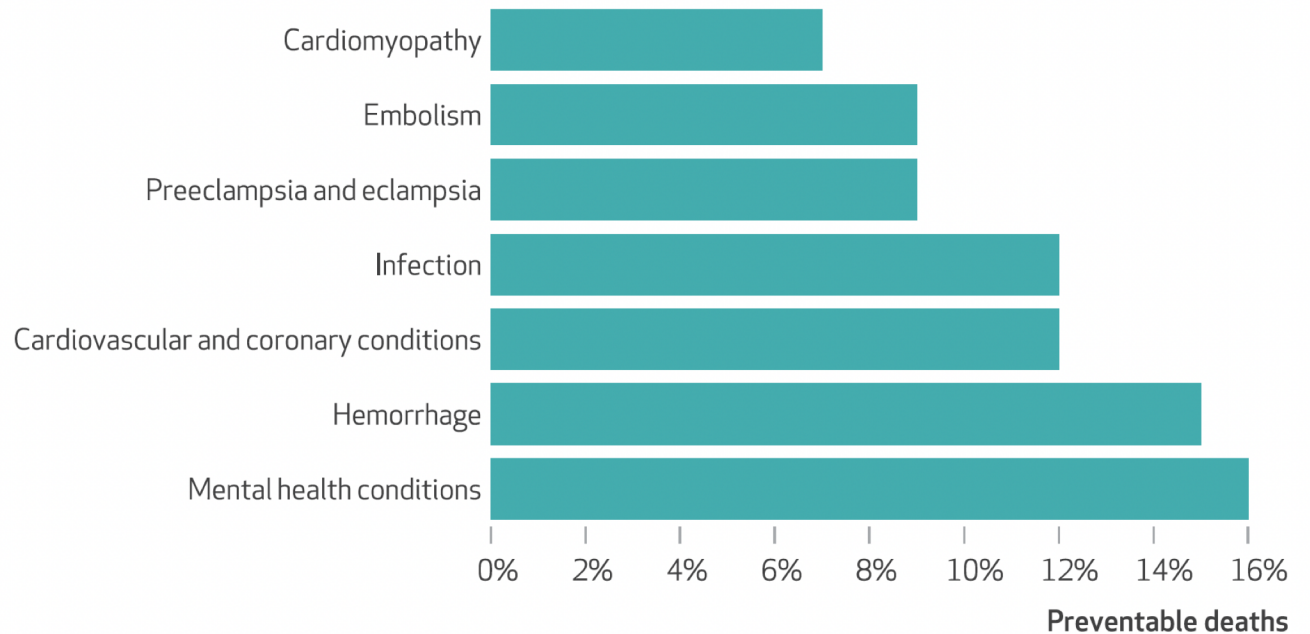
## MATERNAL HEALTH

By Susanna L. Trost, Jennifer L. Beauregard, Ashley N. Smoots, Jean Y. Ko, Sarah C. Haight, Tiffany A. Moore Simas, Nancy Byatt, Sabrina A. Madni, and David Goodman

### Preventing Pregnancy-Related Mental Health Deaths: Insights From 14 US Maternal Mortality Review Committees, 2008–17

DOI: 10.1377/hlthaff.2021.00615  
HEALTH AFFAIRS 40,  
NO. 10 (2021): 1551–1559  
©2021 Project HOPE—  
The People-to-People Health  
Foundation, Inc.

**Leading causes of pregnancy-related death among deaths determined to be preventable in 14 US states, 2008–17**



# POSTPARTUM DEATHS

- California hospital and death data
- 300 postpartum women (up to one year) died between 2010-2012
- Drug-related and suicides nearly 1:5 deaths
  - 74% had at least one emergency room or hospital visit between delivery and death

**TABLE 2**

**Causes and associated 12 month incidence rates of postpartum death, ranked in descending order, among women delivering in California, 2010–2012**

Underlying cause	Deaths, n	Incidence rate (per 100,000 person-years)	95% CI around incidence rate
Obstetric complications/disease	69	6.52	5.15–8.25
Drug related	39	3.68	2.69–5.04
Circulatory system disease	36	3.40	2.45–4.71
Cancer	34	3.21	2.29–4.49
Other unintentional injuries	33	3.12	2.22–4.38
Homicide	17	1.61	1.00–2.58
Suicide	15	1.42	0.85–2.35
All other causes	57	5.38	4.15–6.98

*Goldman-Mellor and Margerison. Drug-related and suicide death as causes of postpartum maternal death. Am J Obstet Gynecol 2019.*

## OBSTETRICS

### Maternal drug-related death and suicide are leading causes of postpartum death in California

Sidra Goldman-Mellor, PhD; Claire E. Margerison, PhD

# SOURCES OF DATA FOR MATERNAL DEATH

- National Vital Statistics Systems
- Pregnancy Mortality Surveillance System
- 
- Maternal Mortality Review Committees



The National Vital Statistics System (NVSS) provides the most complete data on births and deaths in the United States



# DEFINITIONS



## Pregnancy-Associated Death

A death during or within one year of pregnancy, regardless of the cause. These deaths make up the universe of maternal mortality; within that universe are pregnancy-related deaths and pregnancy-associated, but not related deaths.



## Pregnancy-Related Death

A death during or within one year of pregnancy, from a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy.



## Pregnancy-Associated, but Not Related Death

A death during or within one year of pregnancy, from a cause that is not related to pregnancy.



## Pregnancy-Related Mortality Ratio

The number of pregnancy-related deaths (using the above definition) per 100,000 live births.



## Preventability

A death is considered preventable if there was at least some chance of the death being prevented by one or more reasonable changes to patient, family, provider, facility, system, and/or community factors. This definition is used by MMRCs to determine if a death they review is preventable.



## Maternal Death

The death of a woman while pregnant or within 42 days of termination of pregnancy, regardless of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental causes. This definition is used by the National Center for Health Statistics and the World Health Organization.



## Maternal Mortality Ratio

The number of maternal deaths (using the above definition) per 100,000 live births. The maternal mortality ratio is also colloquially called the maternal mortality rate.



## Maternal Mortality

This site uses the term maternal mortality to encompass the topic of deaths during pregnancy, childbirth, and the postpartum period up to 365 days from the end of pregnancy.

<https://reviewtoaction.org/learn/definitions>



# PREGNANCY AND DRUG INDUCED DEATHS

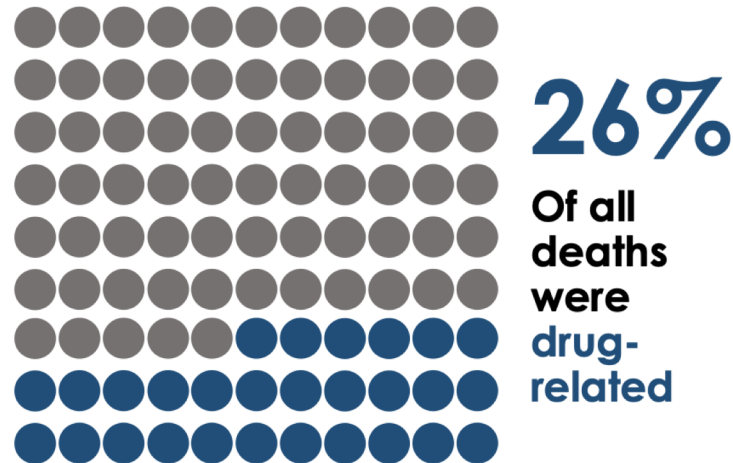
Maternal Morbidity and Mortality: *Original Research*

## 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



# PREGNANCY AND DRUG INDUCED DEATHS

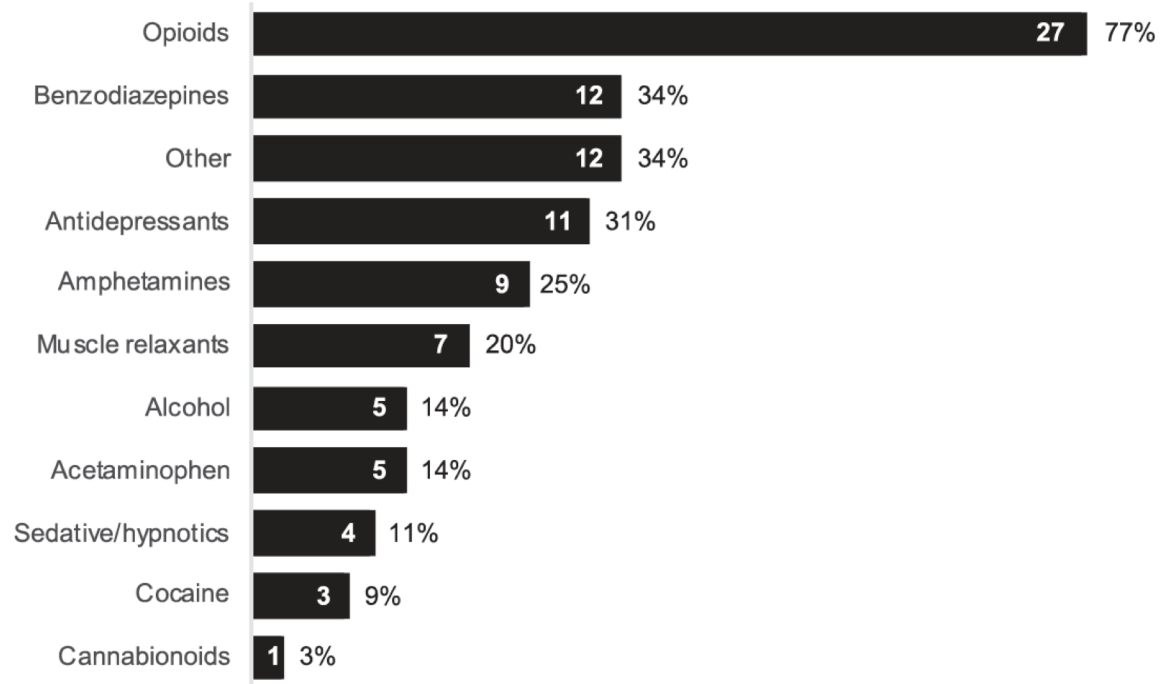
- Polysubstance use 83%
- 66% had 3 or more substances

Maternal Morbidity and Mortality: Original Research

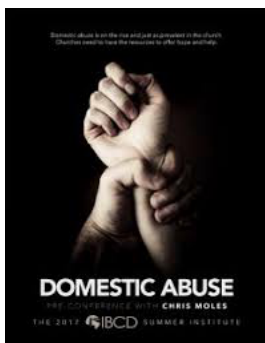
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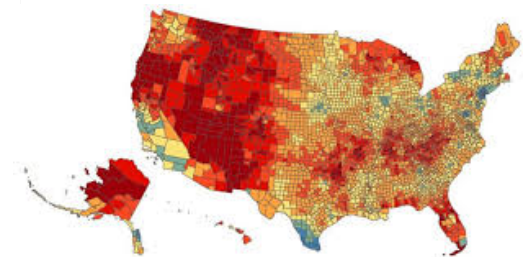
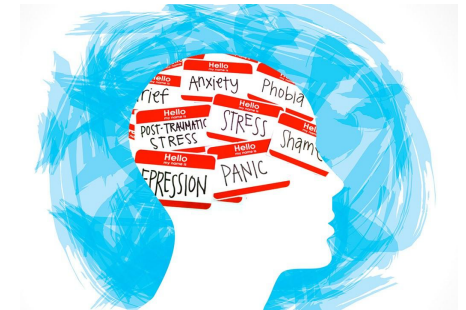
# PREGNANCY AND DRUG RELATED DEATHS



## 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)



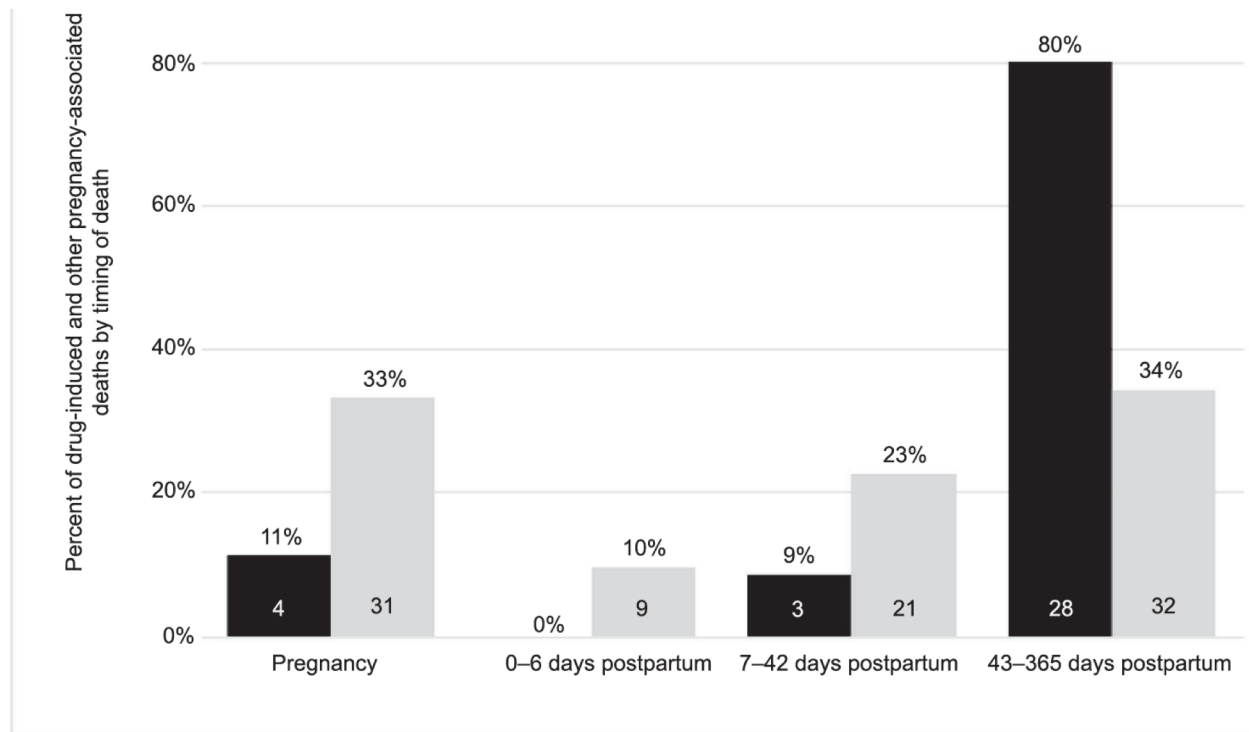
# PREGNANCY AND DRUG RELATED DEATHS

Maternal Morbidity and Mortality: *Original Research*

## Pregnancy-Associated Death in Utah

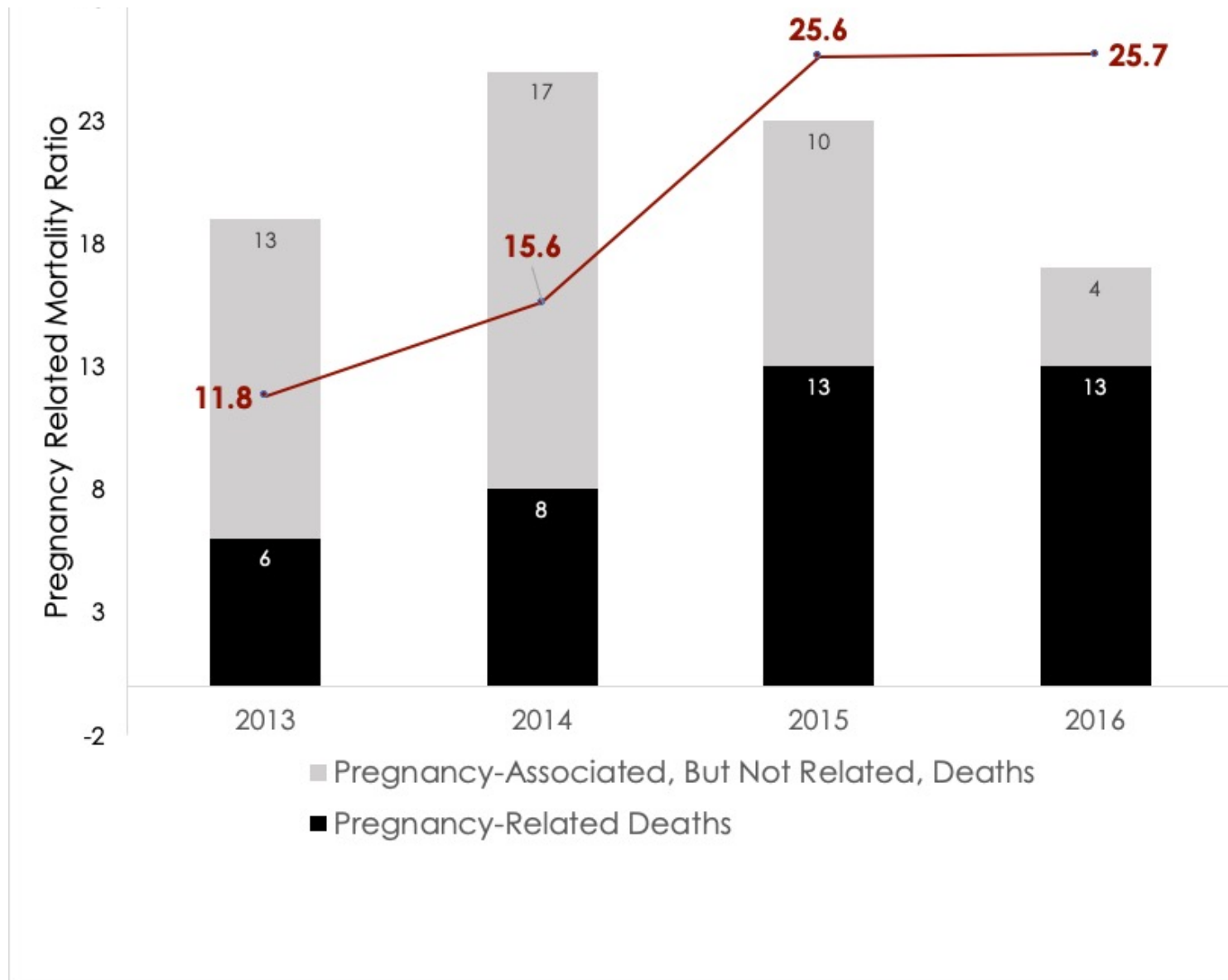
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**Fig. 1.** Proportion of pregnancy-associated, drug-induced deaths vs all pregnancy-associated deaths 2005–2014 (N=136).  
*Smid. Pregnancy-Associated Drug-Induced Deaths in Utah. Obstet Gynecol 2019.*

# WHAT HAPPENED IN UTAH IN 2015?

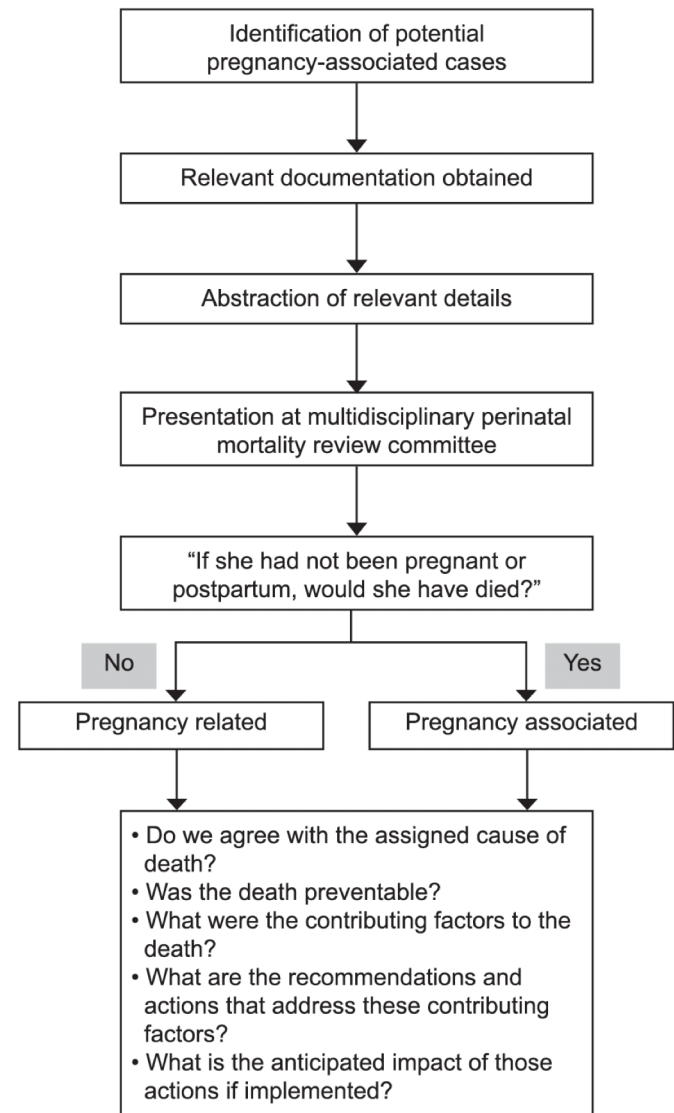


# PREGNANCY RELATED VERSUS ASSOCIATED

*Original Research*

## Standardized Criteria for Review of Perinatal Suicides and Accidental Drug-Related Deaths

*Marcela C. Smid, MD, MS, Jewel Maeda, CNM, MPH, Nicole M. Stone, MPH, Heidi Sylvester, CPM, Laurie Baksh, MPH, Michelle P. Debbink, MD, PhD, Michael W. Varner, MD, and Torri D. Metz, MD, MS*



**Fig. 1.** Flow diagram of Utah's Perinatal Mortality Review Committee process.



# PREGNANCY RELATED DEATH



**Table 1. Standardized Criteria Applied to Accidental Drug-Related Deaths and Suicides**

Standardized Criteria for Accidental Drug-Related Deaths and Suicides	Case Examples	No. of Times Identified in Accidental Drug-Related Death	No. of Times Identified in Suicide
1. Pregnancy complication		7	1
a. Increased pain directly attributable to pregnancy or postpartum events leading to self-harm or drug use that is implicated in suicide or accidental death	Back pain, pelvic pain, kidney stones, cesarean incision, or perineal tear pain	0	0
b. Traumatic event in pregnancy or postpartum with a temporal relationship between the event leading to self-harm or increased drug use and subsequent death	Stillbirth, preterm delivery, diagnosis of fetal anomaly, traumatic delivery experience, relationship destabilization due to pregnancy, removal of child(ren) from custody	7	1
c. Pregnancy-related complication likely exacerbated by drug use leading to subsequent death	Placental abruption or preeclampsia in setting of drug use	0	0

# PREGNANCY RELATED DEATH



**Table 1. Standardized Criteria Applied to Accidental Drug-Related Deaths and Suicides**

Standardized Criteria for Accidental Drug-Related Deaths and Suicides	Case Examples	No. of Times Identified in Accidental Drug-Related Death	No. of Times Identified in Suicide
2. Chain of events initiated by pregnancy		<b>9</b>	<b>3</b>
a. Cessation or attempted taper of medications for pregnancy-related concerns (neonatal or fetal risk or fear of Child Protective Service involvement) leading to maternal destabilization or drug use and subsequent death	Substance use pharmacotherapy (methadone or buprenorphine), psychiatric medications, pain medications	3	1
b. Inability to access inpatient or outpatient drug or mental health treatment due to pregnancy	Health care professionals uncomfortable with treating pregnant women, facilities not available that accept pregnant women	0	0
c. Perinatal depression, anxiety, or psychosis resulting in maternal destabilization or drug use and subsequent death	Depression diagnosed in pregnancy or postpartum resulting in suicide	1	2
d. Recovery or stabilization of substance use disorder achieved during pregnancy or postpartum with clear statement in records that pregnancy was motivating factor with subsequent relapse and subsequent death	Relapse leading to overdose due to decreased tolerance or polysubstance use	5	0

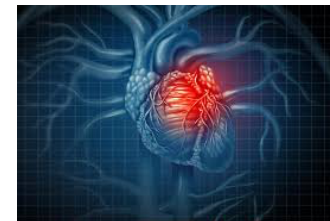
## Drug-Related Deaths

*Marcela C. Smid, MD, MS, Jewel Maeda, CNM, MPH, Nicole M. Stone, MPH, Heidi Sylvestre, CPM, Laurie Baksh, MPH, Michelle P. Debbink, MD, PhD, Michael W. Varner, MD, and Torri D. Metz, MD, MS*

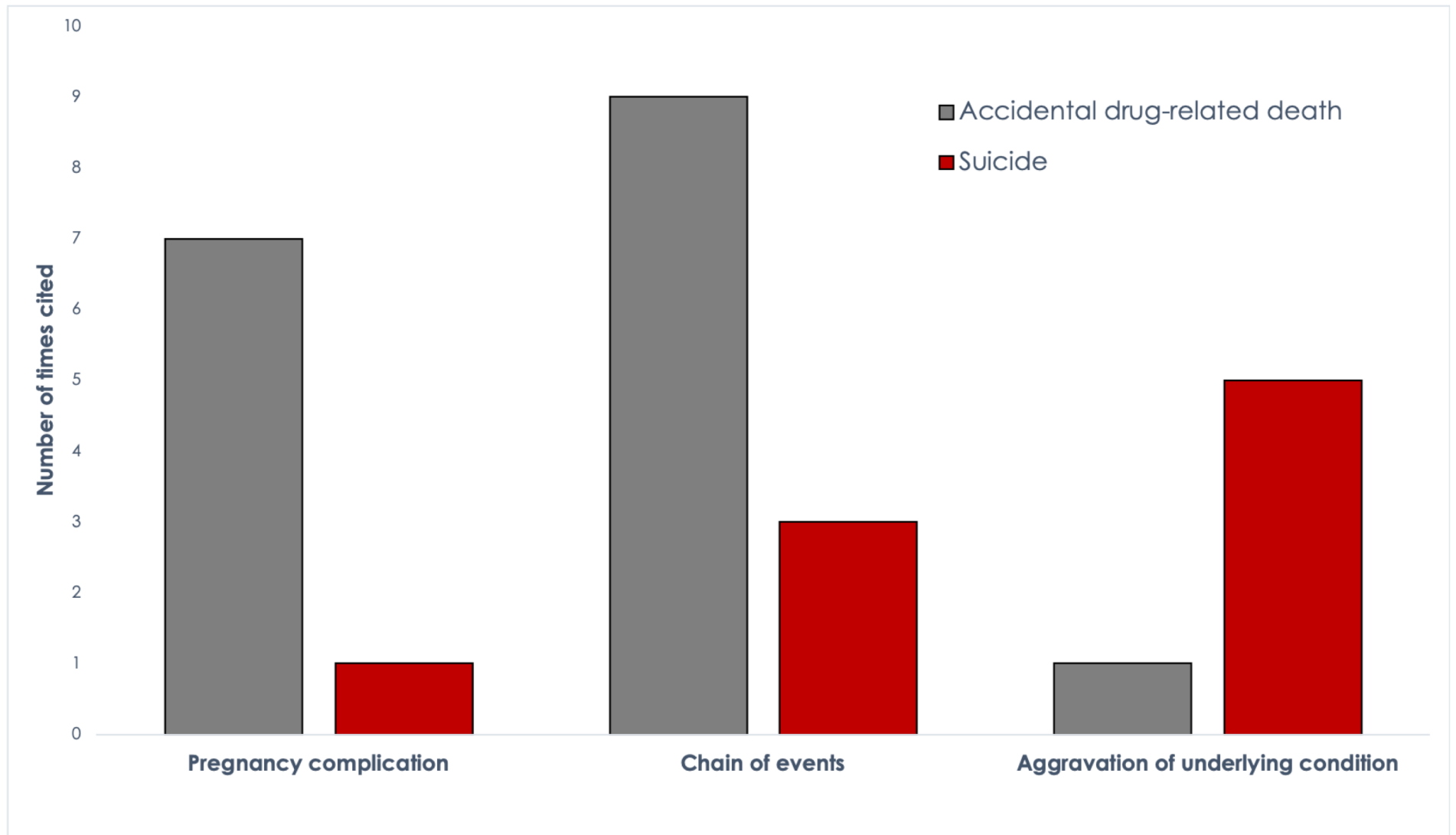
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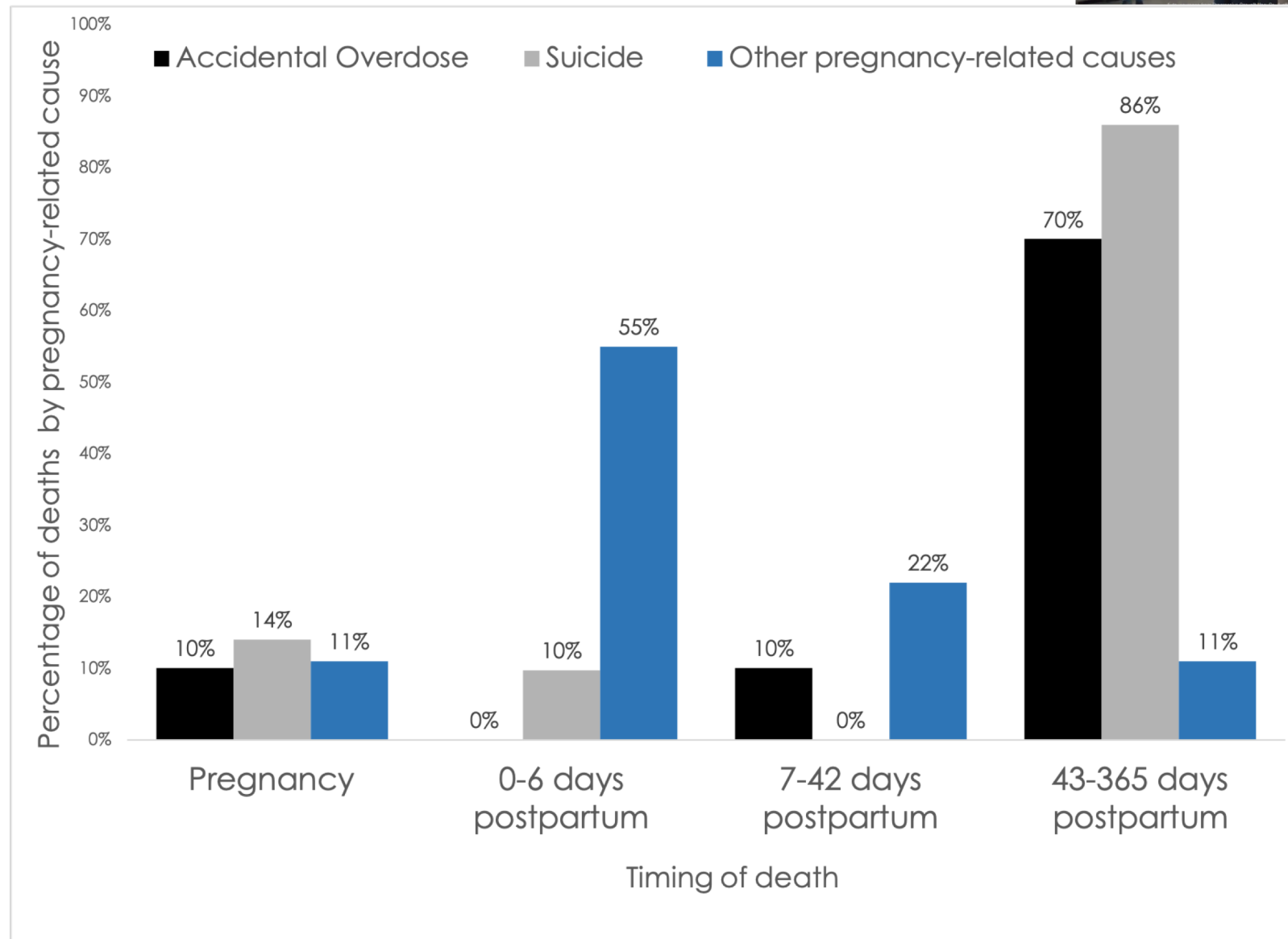
Standardized Criteria for Accidental Drug-Related Deaths and Suicides	Case Examples	No. of Times Identified in Accidental Drug-Related Death	No. of Times Identified in Suicide
3. Aggravation of underlying condition by pregnancy		1	5
a. Worsening of underlying depression, anxiety, or other psychiatric condition in pregnancy or the postpartum period with documentation that mental illness led to drug use or self-harm and subsequent death	Pre-existing depression exacerbated in the postpartum period leading to suicide	1	5
b. Exacerbation, undertreatment, or delayed treatment of pre-existing condition in pregnancy or postpartum leading to use of prescribed or illicit drugs resulting in death, or suicide	Undertreatment of chronic pain leading to misuse of medications or use of illicit drugs, resulting in death	0	0
c. Medical conditions secondary to drug use in setting of pregnancy or postpartum that may be attributable to pregnancy-related physiology and increased risk of complications leading to death	Stroke or cardiovascular arrest due to stimulant use	0	0



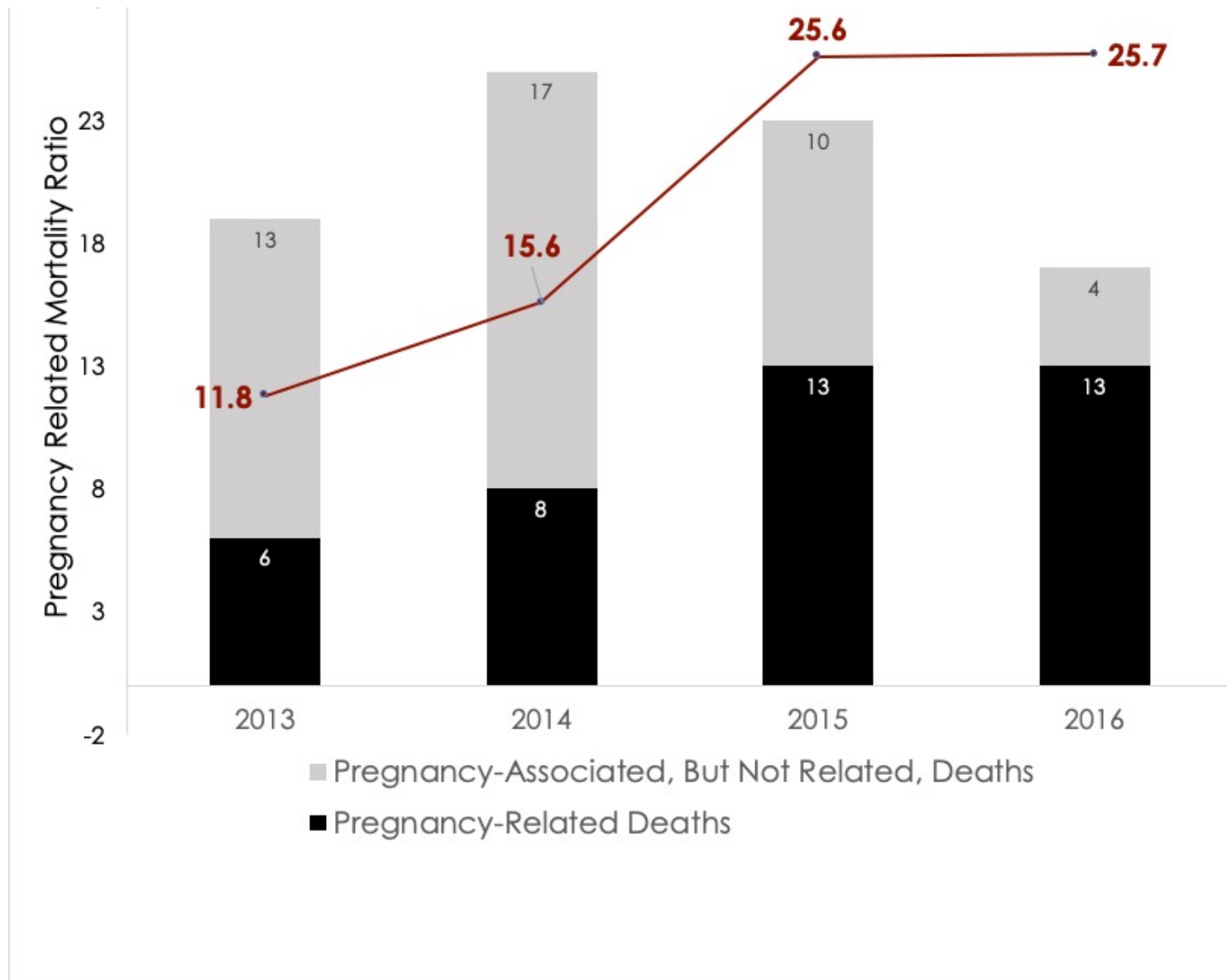
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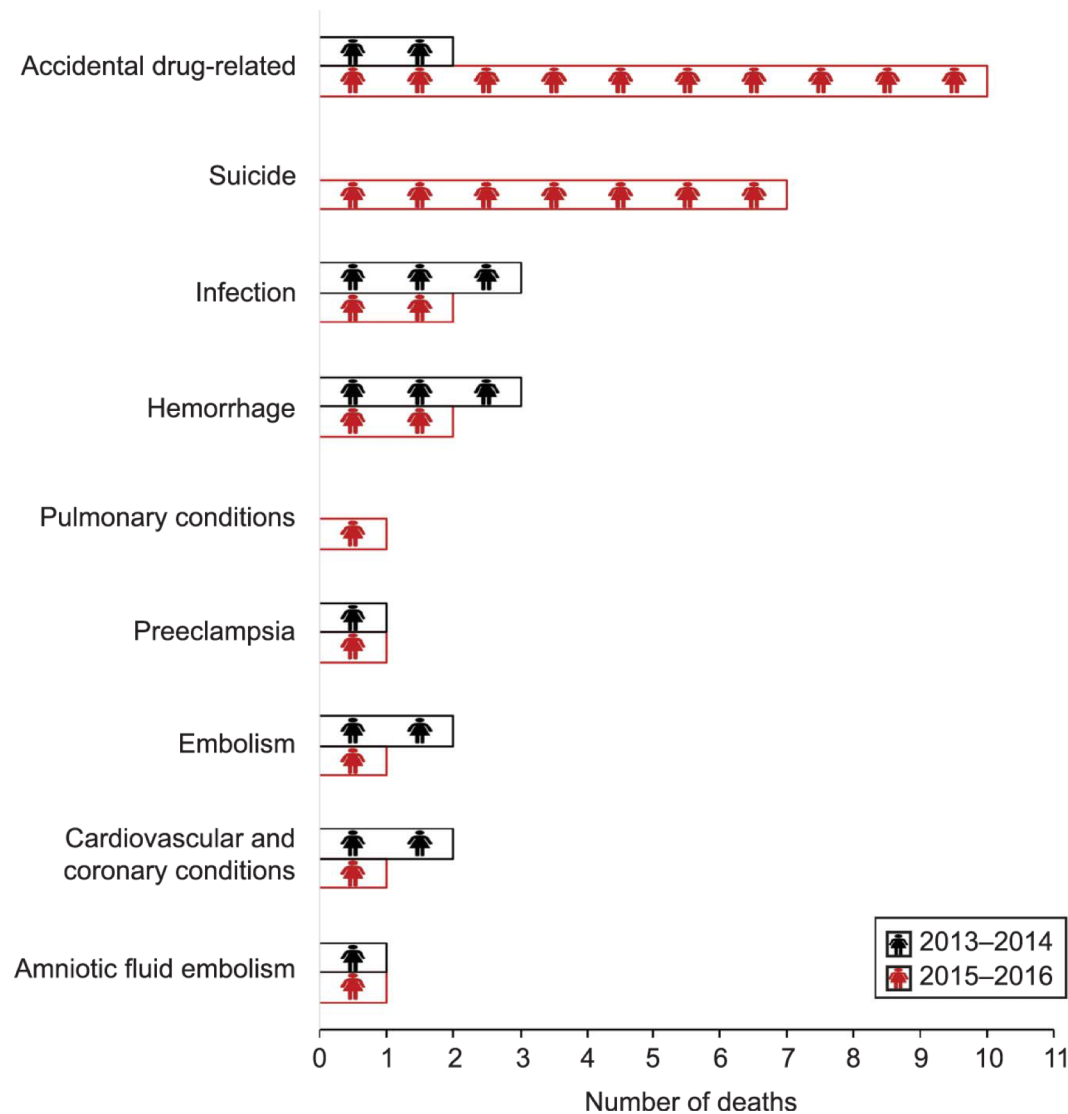


# WHAT HAPPENED IN UTAH IN 2015?





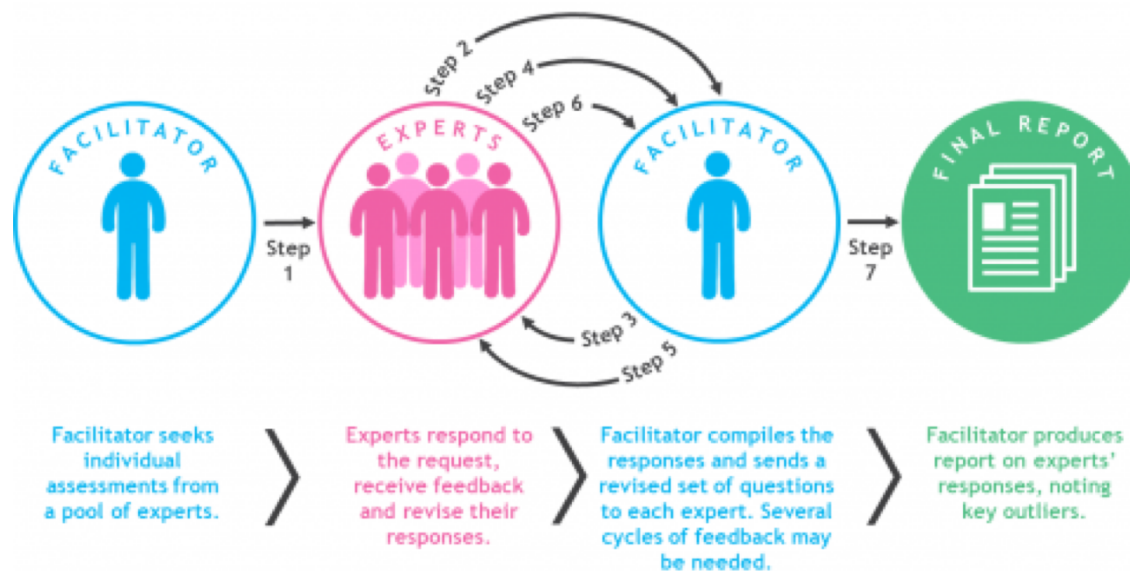
# PREGNANCY RELATED VERSUS ASSOCIATED



**Fig. 2.** Causes of pregnancy-related deaths, 2013–2014 and 2015–2016. *Smid. Drug-Related Death and Suicide Classification Criteria. Obstet Gynecol 2020.*

# DELPHI METHOD. FOR PREGNANCY RELATED CRITERIA

- National consensus
- Representative from each state and other experts (over 50 participants)
- Currently in Round 3



# WHAT NEXT?



- Suicides and drug-related deaths are increasingly prevalent in the US
  - Preventability is hinged on identification and treatment.
- Pregnancy-related-ness is KEY question for pregnancy and suicide deaths.
  - Understanding pregnancy and its role in these deaths will help with identification and treatment.

WHAT NEXT?



**Additional Questions?**

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WHAT NEXT?

