



MONTGOMERY COUNTY COUNCIL

# **BIRTH OUTCOMES OF WOMEN WHO USE SUBSTANCES DURING PREGNANCY**

BY KELSEY RUANE  
JOHNS HOPKINS UNIVERSITY

# **2018**

## ABOUT THE FELLOW

---

Kelsey Ruane is a Master of Public Policy student at the Johns Hopkins Bloomberg School of Public Health. Her main focus is women's reproductive health and interpersonal violence. She became interested in the intersection of public health and social inequality as a sociology major at James Madison University. Her background includes direct services work on a financial assistance hotline, and advocacy work for a legal non profit dedicated to women's rights and equity.

This summer, Kelsey worked with the Department of Epidemiology to analyze the rise in substance use and its effect on maternal and child health. She hopes that the information from this report can be used to improve health and social services for both substance users and pregnant women

## Analysis of hospital utilization in Montgomery County

---

Thank you to Dr. Chunfu Liu, Marlene Michaelson, the Fetal and Infant Mortality Report (FIMR) the Montgomery County Council, and Montgomery County Health and Human Services for making this report possible

8  
1  
0  
2

# EXECUTIVE SUMMARY

The use of drugs during pregnancy is a significant public health concern which is associated with poor maternal and infant health outcomes. The National Survey on Drug use and Health estimates that 5.9 percent of pregnant women will use drugs during the pregnancy. Drug use varies widely from cigarette smoking to opioids, and the effects are often different depending on which drug is used and how often. The current literature includes nationwide patterns in both drug use and pregnancy and analyzes vital statistics and healthcare utilization among women who are found to have used drugs during pregnancy. This research will not include maternal or infant mortality but will instead focus on common deleterious outcomes associated with prenatal drug use.

Montgomery County, MD has ranked first in health outcomes since 2014. For drug use specifically, the rate of illicit drug use in Montgomery County was 7.03 percent compared to 7.56 in Maryland and 8.9 in the United States. Substance abuse, particularly opioid use, is an emerging public health issue, and it is important to examine the impact on birth outcomes. There is good data on the prevalence of drug use and adverse birth outcomes in Montgomery County, but more research is needed on prenatal drug use and healthcare utilization among pregnant women who use substances. The aim of this research is to determine whether Montgomery County, MD follows the national pattern regarding substance use and pregnancy.

This study was conducted using linked birth and inpatient hospital data provided by the Health Services and Cost Review Commission. I calculated birth outcomes which included low birth weight, preterm birth, length of hospital stay, and severe maternal morbidity, and compared the results to patients who had no substance or opioid use. The results show increased risk of preterm and low birth weight, while there was no noticeable difference for length of stay and severe maternal morbidity.

The implications are that in Montgomery County, maternal substance use represents a small but high risk portion of hospital data. The community health needs assessment should consider enhanced data collection practices, and expansion of specialty resources among social services and community health organizations in Montgomery County.

# RESEARCH INTRODUCTION

---

Substantial research demonstrates that substance use during pregnancy results in undesirable birth outcomes such as low birth weight, preterm birth, and small for gestational age infants. Women are at highest risk of developing a substance use disorder during their reproductive age. The issue of prenatal drug use is particularly vital due to the increase in opioid use in the United States. It can be difficult to accurately measure how many women are using drugs during pregnancy. Women with substance use disorders often have less access to healthcare since they are more at risk for being uninsured, low-income, or being in an abusive relationship.

It is well established in national data that women who use drugs during pregnancy have worse birth outcomes than those who do not. The effects vary between drugs that are used and how often they are used. Preterm birth, low birth weight, and being small for the gestational age were the most common conditions researchers found, and they applied to all the drugs studies including tobacco, alcohol, cannabis, stimulants, and opioids. A 2011 analysis found that cocaine users were 3.53 times more likely to deliver a preterm infant. The same analysis found that opioid users were 2.86 times more likely to deliver a preterm infant. A different study which looked at hospital admissions in Massachusetts found similarly strong associations between drug use and risk of low-birth weights. Neonates exposed to substances during pregnancy were more likely to be preterm and low birth weight with odds ratios of 1.86 and 1.94 respectively. Finally, another study compared substance use disorders to psychiatric disorders more generally and found that substance abuse disorders have a more significant impact on birthrates than any psychiatric illness. This study focused on low birth weight and found an odds ratio of 3.7 for substance use and a 2:1 odds ratio for psychiatric diagnoses generally.

Research has also consistently documented the increased healthcare utilization among pregnant women who used drugs during pregnancy. The same study from Massachusetts found higher rates of hospital readmission for substances users even when controlling for income, race, education and other relevant factors. For opiate use, neonatal abstinence syndrome is a large factor in increased healthcare utilization. An analysis of hospital admissions from years 2000-2009 found a substantial increase in healthcare related to neonatal abstinence syndrome, with the cost of related care going from 39,400 in 2000 to 53,400 in 2009.

Though research shows generally worse birth outcomes among substance users, research also shows that these conditions are treatable. The most effective programs are patient-centered holistic health models that prioritize consistent contact with a trusted health provider over total abstinence from substances.

# MAIN TAKEAWAYS FROM NATIONAL LITERATURE

---

-  Maternal substance use is a risk factor for adverse birth outcomes such as preterm birth and low birthweight
-  There is a higher amount of healthcare utilization for women who use drugs during pregnancy, especially for women using opioids
-  Women using drugs are disproportionately affected by poverty, mental illness, lack of access to healthcare, and intimate partner violence
-  A public-health oriented treatment approach to maternal substance use is more effective than a punitive approach

## • aims •

### Scope of Problem

This report aims to identify the scope of the problem of maternal substance use and subsequent adverse birth outcomes in Montgomery County

### Research

The data results will be compared to national literature on the subject to see how Montgomery County compares to national prevalence

### Interventions

This information will be used to support the Fetal and Infant Mortality Review Board (FIMR) in their efforts to implement programs aimed at preventing adverse birth outcomes

## • methodology •

The data for this analysis came from Montgomery County birth records and statewide hospitalization data which were linked into one dataset. Using the demographic and diagnostic data provided, we were able to evaluate patterns in birth outcomes for Montgomery County specifically. To determine the relationship between we ran cross tabulations and frequency distributions between pregnant women who used drugs as compared to those who don't. Prevalence and risk of adverse outcomes were analyzed using odds ratio calculations for risk of adverse outcomes for both substance users and non-substance users. The same analysis was done for women who only used opioids during pregnancy. We included relevant factors such as race, education, type of insurance and marital status. The substance use variable was analyzed alongside data on preterm births, low birth weights, and severe maternal morbidity.

## • definitions •

### Preterm birth

• Any birth taking place between 20 weeks of pregnancy and 37

### Low Birth weight

A birth weight of a liveborn infant of less than 2,500 g (5 pounds 8 ounces) regardless of gestational age.

### Maternal Morbidity

unexpected outcomes of labor and delivery that result in significant short- or long-term consequences to a woman's health

# Demographic information

	Substance Use		No Substance use		Total	
	n	%	n	%	n	%
<b>Total</b>	179	.7	26036	99.3	26215	100
<b>Age</b>						
<b>&lt;20</b>	17	9.4	795	3.1	812	3.1
<b>20-29</b>	96	53.6	8633	33.15	8729	33.3
<b>30-39</b>	62	34.6	15117	58.1	15179	57.9
<b>40+</b>	4	2.2	1491	5.7	1496	5.7
<b>Race</b>						
<b>White</b>	69	38.5	8930	34.2	8999	34.3
<b>Black</b>	71	39.7	5775	22.2	5846	22.3
<b>AI/AN</b>	0	0	247	.9	247	.9
<b>Asian/AP</b>	4	2.2	3748	14.4	3752	14.3
<b>Hispanic</b>	24	13.4	5429	20.9	5453	20.8
<b>Other</b>	11	6.1	1907	7.3	1918	7.3
<b>Payment</b>						
<b>Medicaid</b>	124	69.3	9715	37.3	9839	37.5
<b>Medicare</b>	3	1.7	52	.1	55	.2
<b>Commercial</b>	47	26.3	15250	58.6	15297	58.4
<b>Self</b>	2	1.1	421	1.6	423	1.61
<b>Other</b>	3	1.7	598	2.3	601	2.3
<b>Married</b>						
<b>Yes</b>	120	67	18294	70.3	18414	70.2
<b>No</b>	59	32.9	7734	29.7	7793	29.7
<b>Education</b>						
<b>No high school diploma</b>	41	22.9	7375	29.3	7416	28.3
<b>High school diploma</b>	136	75.9	18538	71.2	18674	71.2

- 69.3 percent of women using substances during pregnancy were on Medicaid, suggesting that low income women are disproportionately at risk for this behavior
- Substance use is higher for both white and black women; however, opioid use specifically is highest among white women only

# Data results

## Outcomes for all substance use

	Substance Use		No Substance Use		Total	
	n	%	n	%	n	%
<b>Total</b>	179	.7	26036	99.3	26215	100
<b>Low birth weight</b>	17	9.5	1924	7.4	1941	7.4
<b>Preterm birth</b>	22	12.3	2457	9.4	2479	9.5
<b>Maternal Morbidity</b>	4	2.2	692	2.7	696	2.7
<b>Length of Stay</b>						
<b>0</b>	3	1.7	44	.2	47	.2
<b>1</b>	8	4.5	1842	7.1	1850	7.1
<b>2</b>	109	60.9	15635	60.1	15744	60.1
<b>3</b>	40	22.3	6639	25.5	6679	25.5
<b>4</b>	12	6.7	1365	5.2	1377	5.3
<b>Method of Birth</b>						
<b>Cesarean</b>	62	34.6	9215	35.4	9277	35.4
<b>Vaginal</b>	117	65.4	16821	64.6	16938	64.6

# Data results

## Outcomes for Opioid use

	Opioid Use		No Opioid Use		Total	
	n	%	n	%	n	%
<b>Total</b>	32	.12	26183	99.87	26215	100
<b>Low Birth Weight</b>	5	15.6	1936	7.4	1941	7.4
<b>Preterm Birth</b>	6	18.8	2473	9.4	2479	9.5
<b>Maternal Morbidity</b>	--	--	696	2.7	696	2.7
<b>Length of Stay</b>						
<b>0</b>	1	3.1	46	.18	47	.2
<b>1</b>	--	--	1850	7.1	1850	7.1
<b>2</b>	21	65.6	15723	60.1	15744	60.1
<b>3</b>	4	12.5	6675	25.5	6679	25.5
<b>4</b>	5	15.6	1372	5.2	1377	5.3
<b>Method of Birth</b>						
<b>Cesarean</b>	11	34.3	9266	35.4	9277	35.3
<b>Vaginal</b>	21	65.6	16917	64.6	16938	64.6

## Data results

# Odds Ratio Low Birth Weight

	Odds Ratio	P-value
All substance use	1.32	.2699
Opioid use	2.41	.0722

# Odds Ratio Preterm Birth

	Odds Ratio	95% Confidence Interval
All substance use	1.72	.2365
Opioid use	2.37	.0533

# Finding I: Maternal substance use cases made up a small portion of overall hospital data

There were only 179 documented cases of maternal substance abuse in this data set; however, cases discovered in hospitals likely do not make up the entire population of women who use drugs. There are many possible explanations for the small number of cases. Pregnant women are less likely to receive drug tests, and women who use drugs may avoid the healthcare system out of fear of being criminalized for their drug use. Women who use substances during pregnancy may also rather disclose to a community health provider or social worker. While the research does establish that substance use during pregnancy causes more adverse birth outcomes, research also suggests that these conditions can be effectively treated if the patient stays in contact with a trained healthcare provider.

## Key Interventions

The research on maternal health and substance use overwhelmingly supports a public health rather than punitive approach to maternal drug use. The county should consider strengthening social services to include the needs of this small, but high-risk population

- Train social services and community health works to deal with the specific needs of pregnant women who use drugs.
- Employ a harm-reduction model towards drug use which prioritizes keeping pregnant women in consistent contact with prenatal and post-partum care.
- Train SMILE nurse case managers to effectively work with the special needs of pregnant substance users.

# Finding II: Maternal substance use is a risk factor for low birth weight and preterm birth

While the hospital data does not break down substance use by all types such as alcohol or stimulants, there is data for patients who used only opioids during pregnancy. The population of women who only used opioids is small; however, the data shows that this group is a high-risk population for adverse pregnancy outcomes. There is a higher percentage of both low birth weight and preterm birth among substance users, though severe maternal morbidity does not seem to be affected using substances.

Even if someone is using substances during pregnancy, it is still possible to manage the symptoms if a pregnant woman has consistent access with a healthcare provider. With this in mind, it is important to train clinicians and community providers to consider the specific needs of this population

## Key Interventions

Though maternal substance use causes a higher risk of adverse birth outcomes, many times the conditions can be treated with proper medical care

- Offer optional drug screening and pregnancy tests at behavioral health and family planning centers
- Require community center staff to be educated on treatment and prevention of low birth weight and preterm birth for both substance users and non substance users
- Co-locate mental health providers and family planning providers

# Finding III: Opioid use was an especially high risk factor for preterm birth and low birth weight

The rise in opioid misuse has devastated the country, and the negative effects pregnant women are clear from the data. There has been a rise in both federal and local funds that are meant to combat addiction to opioids. For example, one intervention is to increase access to drugs like buprenorphine, which help manage the symptoms of opioid addiction and decrease the likelihood of overdosing. Due to misconceptions about substance use and pregnancy, pregnant women are often denied effective treatment efforts. Research shows that stopping opioid use without proper detoxification treatment is by far the most dangerous action a pregnant woman can take.

## Key interventions

Pregnant women are also affected by the national rise in opioid use, but government funds for the crisis do not always consider the specific needs of pregnant women addicted to opioids.

- Expand access to buprenorphine to pregnant opioid users, as it is the least harmful substance during pregnancy.
- Provide pregnant women referrals to medically-assisted detox programs in combination with follow up management and rehabilitation care

# RECOMMENDATIONS

- 1 Require comprehensive training on issues regarding care for maternal substance use for both family planning and behavioral health providers
- 2 Expand access to medically assisted opiate treatment for pregnant women using a harm reduction model of care
- 3 Refer women using substances to case-management programs such as SMILE nurse case management program

---

---

## FUTURE RESEARCH

---

### **HOW CAN MATERNAL SUBSTANCE USE DATA BE IMPROVED?**

The data on maternal substance use is likely incomplete due to the stigma and fear that women often feel if they are unable to stop using substances during pregnancy

---

### **BEST PRACTICES FOR INTEGRATED APPROACHES TO CARE**

Preliminary research shows that integrated, co-located family, health, and substance use providers have benefits over non integrated approaches; however, the lack of data makes it difficult to draw definite conclusions

---

---

# CONCLUDING REMARKS

Montgomery County is already making strides in behavioral and community health at a time where substance use, mental health, and opioid addiction are all of crucial concern. The issue of maternal substance use represents a population that is stigmatized for their mental health needs. Research supports the claim that substance use during pregnancy generally results in worse birth results. These outcomes tend to be exacerbated by other factors that substance users face such as stigma, fear of arrest, and lack of access to specialty care.

The increase in substance use, particularly opioid use, has public health professionals looking for evidence-based interventions. The Montgomery County Fetal and Infant Mortality Review Board (FIMR) is tasked with making Montgomery County specific recommendations, many of which include an increase in community healthcare and case-management services. They note that low birthweight and preterm birth are risk factors for infant mortality, and there are significant racial disparities for birth outcomes between white women and black women.

For Montgomery County, FIMR makes a wide range of recommendations, many of which require participation from community health providers. Examples of potential interventions include SMILE nurse case managements which helps women monitor their health and development throughout pregnancy. Other programs include nutritional education and assistance and connecting women with family planning assistance. This research should serve as a reminder that substance use is a complicating factor in pregnancy as well, and the rise in opioid use requires an integrated approach that involves experts in both family planning and behavioral health.

***Kelsey Ruane***

2018 FELLOW, HEALTH AND HUMAN SERVICES  
JOHNS HOPKINS UNIVERSITY

# REFERENCES

---

Bishop, D., Borkowski, L., Couillard, M., Allina, A., Baruch, S., & Wood, S. (n.d.). PREGNANT WOMEN AND SUBSTANCE USE: AN OVERVIEW OF RESEARCH & POLICY IN THE UNITED STATES. Retrieved from [https://publichealth.gwu.edu/sites/default/files/downloads/JIWH/Pregnant\\_Women\\_and\\_Substance\\_Use\\_updated.pdf](https://publichealth.gwu.edu/sites/default/files/downloads/JIWH/Pregnant_Women_and_Substance_Use_updated.pdf)

Committee Opinion No. 473: Substance Abuse Reporting and Pregnancy: The Role of the Obstetrician–Gynecologist. (2011). *Obstetrics & Gynecology*, 117(1), 200-201. doi:10.1097/aog.0b013e31820a6216

Forray, Ariadna. Substance Use During Pregnancy. (2016, May) Retrieved on June 5, 2018 from [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4870985/#\\_\\_sec3title](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4870985/#__sec3title)

Hwang, Sunah S, Diop Hafsadou, Liu, Chia-ling, Yu Qi, Babakhanlou-chase Hermik, Cui Xiaohui, Kotelchuck Milton. Prenatal hazardous substance use and adverse birth outcomes (2017, December) Retrieved on June 5, 2018 from [https://www.jpeds.com/article/S0022-3476\(17\)31105-8/fulltext](https://www.jpeds.com/article/S0022-3476(17)31105-8/fulltext)

Kelly, Rosemary H, Russo Joan, Holt Victoria, Danielsen Beate, Zatzick Douglas, Walker Edward, Katon Wayne. Psychiatric and substance use disorders as risk factors for low birth weight and preterm delivery. (2002, August). Retrieved on June 5, 2018 from <https://www.ncbi.nlm.nih.gov/pubmed/12151153>

Milligan, K., Niccols, A., Sword, W., Thabane, L., Henderson, J., & Smith, A. (2011). Birth outcomes for infants born to women participating in integrated substance abuse treatment programs: A meta-analytic review. *Addiction Research & Theory*, 19(6), 542-555. doi:10.3109/16066359.2010.545153

# REFERENCES

---

Montgomery County, Maryland, Department of Health and Human Services, Office of Planning and Epidemiology. Health in Montgomery County,

Patrick SW, Schumacher RE, Benneyworth BD, Krans EE, McAllister JM, Davis MM. Neonatal Abstinence Syndrome and Associated Health Care Expenditures: United States, 2000-2009. *JAMA*. 2012;307(18):1934–1940. doi:10.1001/jama.2012.3951

Rankings: Montgomery County, MD. (n.d.). Retrieved from <http://www.countyhealthrankings.org/app/maryland/2018/rankings/montgomery/county/outcomes/overall/snapshot>  
2008-2016: A surveillance report on population health. Rockville, Maryland. 2018