



VCU

School of Medicine
Health Behavior and Policy

Diagnosis and Treatment of Substance Use Disorders among Pregnant Women Covered by Medicaid

An Evaluation Report Prepared for the Department of Medical Assistance Services

May 2020

Executive Summary

Substance use during pregnancy can result in adverse maternal and neonatal health outcomes, especially if left untreated. Virginia implemented the Addiction and Recovery Treatment Services (ARTS) program in April 2017 to increase access to treatment for Medicaid members with opioid or other substance use disorders (SUD), including pregnant women with these conditions. This report examines diagnosis and treatment of SUD among pregnant women enrolled in Medicaid who gave birth during 2017 or 2018.

Pregnant women with SUD included in this study had 6 or more months of continuous enrollment in full Medicaid coverage prior to their live delivery, as well as a diagnosis of SUD in the 12 months prior to their delivery. Treatment for SUD includes any type of outpatient, residential, inpatient or pharmacotherapy services received related to a SUD. Due to limitations of administrative claims data, pregnancy, SUD diagnosis, and SUD treatment are only identified if a billable service was performed.

Key findings from the report include:

- **One in 10 pregnant women enrolled in Medicaid had a diagnosis of SUD in the 12 months prior to delivery**, including 3 percent of pregnant women with a diagnosis of opioid use disorder (OUD). Six percent of pregnant women had a SUD diagnosis for substances other than opioids or alcohol, such as cannabinoids, cocaine, and stimulants.
- Among pregnant women with SUD, **36 percent received some type of treatment in the 12 months prior to their delivery**. However, **treatment rates vary widely by type of substance**: from 70 percent of women with OUD receiving treatment, to 17 percent of members with SUD other than OUD or Alcohol Use Disorder (AUD) receiving treatment.
- **Treatment rates for OUD increased considerably**, from 58 percent during January through June 2017 – when the ARTS program was implemented – to 76 percent during July through December 2018.
- **Most treatment for SUD among pregnant women is provided on an outpatient basis**. Few women receive treatment in medically managed inpatient, short-term residential or intensive outpatient facilities prior to delivery. **Among pregnant women with OUD, about half receive pharmacotherapy**, including 42 percent who receive buprenorphine and 9 percent who receive methadone treatment.
- Among women diagnosed with SUD, **black women were less than half as likely to receive any treatment prior to delivery (20 percent) compared to white women (44 percent)**. These disparities persist across all Virginia regions.
- **Treatment rates for OUD are higher among women with live deliveries (70 percent) compared to women with non-live deliveries (63 percent)**.

- In 2017 and 2018, **3.7 percent of newborns were diagnosed with neonatal abstinence syndrome (NAS) within one year of birth.**

Overview

Substance use during pregnancy can result in adverse maternal and neonatal outcomes, especially if left untreated. Nationally, rates of opioid use disorder (OUD) among mothers at the time of delivery quadrupled between 1999-2014, consistent with overall trends in OUD prevalence.¹ Opioid use by pregnant women is linked to higher rates of preterm labor, stillbirths, neonatal abstinence syndrome (NAS), and maternal mortality.^{2,3}

Although effective treatment for substance use disorders (SUD) can reduce the likelihood of adverse outcomes, a number of factors may prevent pregnant women from obtaining treatment, including lack of access to addiction treatment services, stigma, and fear of child welfare actions following the delivery of their newborn.^{4,5} As Medicaid covers nearly 40 percent of births in Virginia,⁶ an additional concern is that many pregnant women who are eligible for Medicaid are not enrolled at the beginning of their pregnancy, resulting in delays in prenatal care and treatment for other conditions, including SUD.⁷

Virginia implemented the Addiction and Recovery Treatment Services (ARTS) program in April 2017 to increase access to treatment for Medicaid members with OUD or other SUD, including for pregnant women. ARTS benefits cover a wide range of addiction treatment services, including withdrawal management, residential treatment, partial hospitalization, intensive outpatient programs, opioid treatment, case management and peer recovery support services. ARTS services are carved into existing Medicaid managed care plans to support full integration of behavioral and physical health.

The purpose of this report is to estimate diagnosed prevalence and treatment of SUD among pregnant women enrolled in Virginia Medicaid. We examine both the prevalence of SUD and OUD in the 12 months prior to delivery, as well as the percentage of women with diagnosed SUD who received treatment during the same period. The report examines racial/ethnic and geographic disparities in diagnosed prevalence and treatment for SUD among pregnant women, as well as trends during the period before and after implementation of the ARTS program. Finally, the report provides estimates of NAS among newborns.

Methodology

The analyses presented in this report are based on paid, administrative claims data for deliveries with dates of service during 2017 and 2018. Deliveries were identified using the CMS Child and Adult Core Set non-HEDIS measure definitions, specifically the live birth code set detailed in measure CCP-A, and non-live delivery events detailed in CCP-B.⁸ Consistent with measure criteria, the live birth rationale identifies live and non-live deliveries using standard code sets consisting of ICD-10-CM, ICD-10-PCS, and CPT codes. Although a woman may have more than one delivery during the measurement period, a minimum of 180 days is required between deliveries to identify live births. No minimum time duration is required between non-live deliveries.

With Medicaid claims data, it is difficult to consistently identify the beginning of a pregnancy or the trimester in which a SUD diagnosis or treatment occurred. Therefore, consistent with other published studies, pregnant women were identified as having a SUD if there was a diagnosis on any claim in the 12 months prior to delivery.⁹ Diagnosis of any SUD, including OUD and other SUD, was based on ICD-10-CM codes, consistent with other published sources.¹⁰

Similarly, pregnant women who received treatment for SUD were identified based on having any type of specialized addiction treatment service in the 12 months prior to delivery. Addiction treatment services include the full continuum of services based on the American Society for Addiction Medicine (ASAM) criteria.¹¹ Addiction treatment services also include pharmacotherapy, such as the use of buprenorphine, methadone, and naltrexone, for the treatment of OUD. The definition of addiction treatment services is similar to that used in other evaluation reports of the ARTS program.¹²

Importantly, due to the nature of administrative data, women with limited Medicaid enrollment prior to delivery will be less likely to have any SUD diagnosis or treatment in the 12 months prior to their delivery compared to women eligible for full-Medicaid benefits for the entire duration of their pregnancy. In order to reduce the potential bias in estimating diagnosed prevalence and treatment of SUD associated with length of Medicaid enrollment, the main analyses presented in this report are limited to women with at least six months of continuous enrollment with full Medicaid benefits prior to their delivery. Any bias due to women with SUD being more or less likely to remain continuously enrolled in Medicaid is not accounted for in this analysis.

Prevalence and Treatment of Diagnosed Substance Use Disorders among Pregnant Women

Of the 46,500 live deliveries in 2017 and 2018 by women with 6 or more months of continuous, full Medicaid benefits, 10 percent had a diagnosis of SUD in the 12 months prior to delivery. Among those with a diagnosed SUD, 36 percent received some type of treatment in the 12 months prior to their delivery. Treatment for SUD includes any of the following: inpatient detoxification, residential treatment, partial hospitalization, outpatient or intensive outpatient treatment, and pharmacotherapy.

While 3 percent of pregnant women had a diagnosis of an OUD in the 12 months prior to their delivery, only 1 percent had a diagnosis of alcohol use disorder (AUD). The low prevalence of diagnosed AUD is in contrast to the general Medicaid population, in which AUD is almost as prevalent as OUD.¹² Other SUD, such as those related to cannabinoids, other psychoactive substances, cocaine and other stimulants, have higher diagnosed prevalence as a group (6 percent) than either OUD or AUD.

Treatment rates are highest among pregnant women with OUD compared to other substances. Among those with a diagnosis of OUD, 70 percent received some type of treatment in the 12 months prior to their delivery, while 30 percent of those with diagnosed AUD received treatment. Among those with addictions to other substances, 17 percent received treatment.

Prevalence of substance use disorders for women prior to delivery

	2017–2018
Number of live deliveries in 2017 and 2018 to women with 6 or more months of full Medicaid coverage prior to delivery	46,500
Any substance use disorder (SUD)	4,649
Percent any SUD diagnosis in 12 months prior to delivery	10%
SUD treatment rate¹	36%
Opioid use disorder (OUD)	1,395
Percent any OUD diagnosis in 12 months prior to delivery	3%
OUD treatment rate¹	70%
Alcohol use disorder (AUD)	465
Percent any AUD diagnosis in 12 months prior to delivery	1%
AUD treatment rate¹	30%
Other SUD²	2,790
Percent with other SUD diagnosis in 12 months prior to delivery	6%
Other SUD treatment rate¹	17%

¹Reflects the number who received any addiction treatment service, as a percentage of those with a diagnosed disorder.

²Other SUD includes cannabinoids, other psychoactive substances, cocaine, other stimulants, sedative hypnotics, poisoning, hallucinogens, inhalants, and miscellaneous substance abuse.

Prevalence and treatment of SUD by length of enrollment in Medicaid. Women may enroll in Medicaid late in their pregnancy, and, therefore, may not receive the full benefit of prenatal or addiction treatment services. Of the 63,400 live deliveries in 2017 and 2018, 4 percent of women were enrolled for less than one month prior to their delivery, while 23 percent were enrolled for one to six months prior to their delivery.ⁱ Only 27 percent of women were enrolled for 12 months or longer prior to their delivery, consistent with the eligibility criteria for pregnant women in Virginia prior to Medicaid expansion.

Not surprisingly, prevalence and treatment of SUD increased along with the length of time of enrollment in Medicaid. Diagnosed prevalence of SUD ranged from 4 percent among those enrolled in Medicaid less than one month prior to delivery, to 14 percent among those enrolled 12 months or longer, likely reflecting the length of time available to seek a diagnosis. Similarly, treatment rates for SUD ranged from 19 percent among those enrolled less than one month prior to delivery, to 36 percent among those enrolled 6 months or longer.

It is likely that some women were diagnosed and receiving treatment for SUD prior to their enrollment in Medicaid, either through other health insurance or as uninsured receiving treatment through publicly funded providers, such as Community Service Boards. In general, uninsured people with SUD experience greater barriers to treatment compared to those with Medicaid. In fact, nationally, Medicaid SUD treatment rates are higher than those with no insurance and those with other health insurance coverage.¹³

SUD diagnosis prevalence and treatment by length of time enrolled in Medicaid prior to delivery

	Months of continuous full Medicaid coverage prior to delivery				
	Any full Medicaid Coverage	< 1 month	1-6 months	6-12 months	12 months or longer
Number of live deliveries in 2017 and 2018	63,400	2,310	14,590	29,350	17,150
Percent of deliveries	100%	4%	23%	46%	27%
Substance use disorders	5,707	93	1,022	2,348	2,400
Percent any SUD diagnosis	9%	4%	7%	8%	14%
SUD treatment rate	34%	19%	29%	36%	36%
Opioid use disorder	1,902	46	438	880	857
Percent any OUD diagnosis	3%	2%	3%	3%	5%
OUD treatment rate	68%	35%	60%	72%	69%

ⁱ In contrast to other estimates in this report that are restricted to live deliveries with 6 or more months of continuous Medicaid coverage prior to the delivery, these estimates are based on all live deliveries.

Increase in treatment rates for SUD. Prior evaluation reports of the ARTS program showed large increases in treatment rates for members with SUD.¹² Increases in treatment rates between 2017 and 2018 for pregnant women with SUD are consistent with the trends observed in prior reports. While there was little change in prevalence in SUD, overall treatment rates for SUD increased from 30 percent during the first half of 2017 (at the time ARTS was implemented) to 40 percent during the second half of 2018. The increase in treatment rates was more pronounced for OUD, from 58 percent during the first half of 2017 to 76 percent during the second half of 2018.

Diagnosis and treatment rates for women with SUD and OUD diagnosis prior to delivery

	Jan–June 2017	July–Dec 2017	Jan–June 2018	July–Dec 2018
Number of live deliveries	11,270	12,110	11,500	11,630
SUD prevalence in 12 months prior to delivery	1,104	1,211	1,148	1,280
Percent any SUD diagnosis	10%	10%	10%	11%
OUD prevalence in 12 months prior to delivery	338	363	344	349
Percent with OUD diagnosis	3%	3%	3%	3%
SUD treatment rate in 12 months prior to delivery*				
Treatment rate for SUD¹	30%	33%	39%	40%
Treatment rate for OUD¹	58%	64%	76%	76%

*Includes deliveries for women with 6 or more months of continuous full Medicaid coverage prior to delivery and a diagnosis of SUD or OUD in the 12 months prior to delivery.

¹Reflects the number of members who received any addiction treatment service as a percentage of those with a diagnosed disorder.

Type of Treatment Services Utilized by Pregnant Women with SUD

The ARTS program covers a broad range of addiction treatment services along the continuum of care as defined by ASAM criteria.¹¹ These include medically managed intensive inpatient services, short-term residential treatment, partial hospitalization and intensive outpatient services, methadone treatment at Opioid Treatment Programs (OTP), and other outpatient services. The ARTS program also introduced a new model of care delivery, the Preferred Office-Based Opioid Treatment (OBOT) program that pays significantly higher reimbursement rates to qualified providers for medication for opioid use disorder (MOUD), behavioral health therapy and coordination with other medical and social needs.

Outpatient services are the most frequently used type of treatment among women prior to delivery. Among pregnant women receiving SUD treatment after ARTS implementation, 31 percent received treatment at a Preferred OBOT or OTP, and 72 percent received some other type of outpatient treatment consistent with ASAM Level 1 services. Far fewer women received partial hospitalization or intensive outpatient services (ASAM Level 2), short-term residential treatment (ASAM Level 3), or medically managed intensive inpatient services (ASAM Level 4).

Type of treatment received in the year prior to delivery*

	All SUD-related deliveries
Number of live deliveries between 2017 and 2018*	1,659
Used OBOT or OTP provider	31%
Used other outpatient service (ASAM 1)	72%
Used intensive outpatient service (ASAM 2)	7%
Used short-term residential treatment (ASAM 3)	2%
Used medically managed intensive inpatient (ASAM 4)	7%

*Includes deliveries between 2017 and 2018 in which women with 6 or more months of continuous full Medicaid coverage prior to delivery received treatment for SUD or OUD in the 12 months prior to delivery.

Pharmacotherapy for pregnant women with OUD. Medication for Opioid Use Disorder (MOUD) involves the use of pharmacotherapy to treat OUD, including buprenorphine (Suboxone), methadone and naltrexone (Vivitrol). Among women with OUD, 50 percent of those continuously enrolled 6 or more months prior to delivery received pharmacotherapy in the year prior to delivery. Buprenorphine is by far the most commonly use pharmacotherapy, with 42 percent of those with OUD receiving buprenorphine. Rates of use are considerably lower for methadone (9 percent). Virtually no pregnant women with OUD were treated with naltrexone or Vivitrol, which is consistent with American College of Obstetricians and Gynecologists recommendations because of unknown fetal effects associated with these medications.¹⁴

Pharmacotherapy for pregnant women with opioid use disorder

	Women with a live delivery and diagnosis of OUD
Total number in 2017 and 2018 with OUD*	1,395
Percent received any pharmacotherapy	50%
Percent received buprenorphine	42%
Percent received methadone	9%

*Includes live deliveries for women with 6 or more months continuous full Medicaid coverage prior to delivery who had a diagnosis of OUD in the 12 months prior to delivery.

Differences in Diagnosis and Treatment of SUD by Race

The Centers for Disease Control and Prevention recently reported that black women are about three times as likely to die of pregnancy-related causes compared to white women.¹⁵ Both higher prevalence of a number of social and health-related risk factors and lower access to prenatal care likely contribute to higher maternal mortality among black women. Disparities in treatment rates for women with SUD while pregnant may be an additional cause.

Among women enrolled in Medicaid who gave birth in 2017 and 2018, diagnosed prevalence of SUD in the 12 months before delivery is one-third higher among white women (12 percent) compared to black women (8 percent). However, among those with a diagnosis, black women are less than half as likely to receive treatment in the 12 months before delivery (20 percent) compared to white women (44 percent). Similar trends can be seen in diagnosis and treatment for OUD. Few black women in Virginia Medicaid are diagnosed with OUD (1 percent). Among those with a diagnosis of OUD, white women were much more likely to be treated (73 percent) compared to black women (54 percent).

Women in other racial groups are even less likely to be diagnosed with SUD (4 percent) than black women. Treatment rates are also lower among women who are another race/ethnicity compared to white women (35 percent for SUD, too few for statistical analysis for OUD).

Prevalence and treatment of SUD by race/ethnicity

	White	Black	Other
Number of live deliveries between 2017 and 2018*	24,630	19,160	2,710
Any substance use disorder	2,955	1,532	108
Diagnosed prevalence	12%	8%	4%
Treatment rate	44%	20%	35%
Opioid use disorder	1,231	192	27
Diagnosed prevalence	5%	1%	1%
Treatment rate	73%	54%	--

*Includes deliveries for women with 6 or more months of continuous full Medicaid coverage prior to delivery.

--Valid estimate not possible due to too few observations.

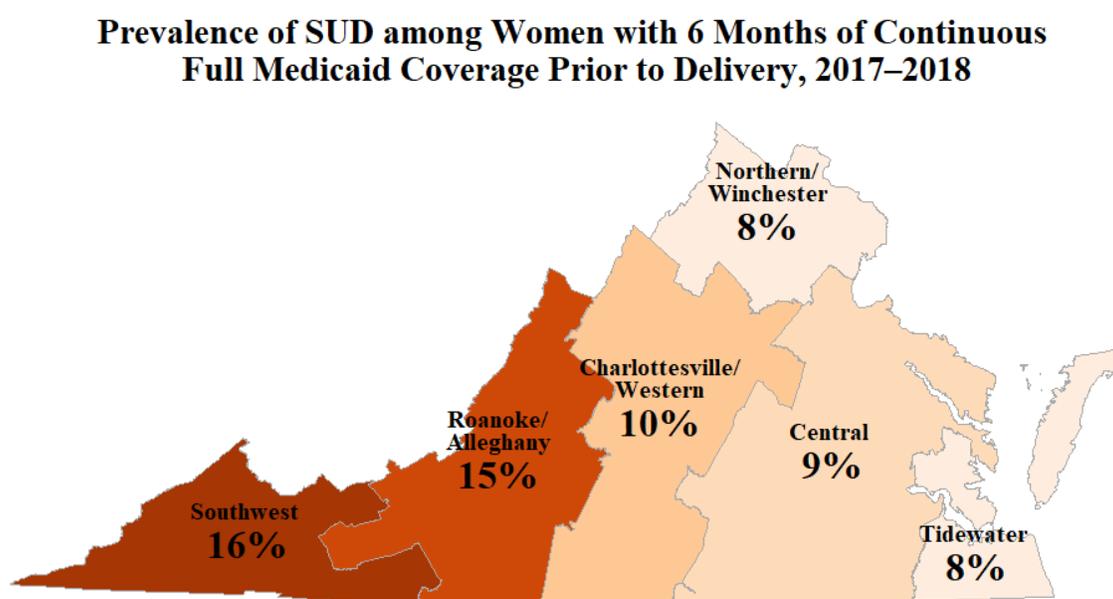
Differences by race in the amount of time enrolled in Medicaid coverage prior to delivery was also assessed, as that could contribute to disparities in diagnosis and treatment. For example, if black women had greater delays in Medicaid enrollment compared to white women, such delays could explain lower treatment rates. However, there were no substantial differences in length of time in Medicaid prior to delivery by race (findings not shown), indicating that this factor does not explain disparities in diagnosis and treatment.

It is likely that SUD is under-diagnosed in all women, but especially under-diagnosed among black women. Evidence that SUD may be under-diagnosed among black women is suggested by national survey data on self-reported problems with alcohol or drug use, which does not depend

on a physician's diagnosis. Nationally, black women of childbearing age (18–49) are as likely to self-report SUD in the past year (7.4 percent) as are white women (7.2 percent).¹³ Greater barriers to treatment experienced by black women – whether due to lower access, greater stigma, lack of trust in health care providers or greater fear of child welfare actions – are likely to result in a lower probability that SUD will be diagnosed.

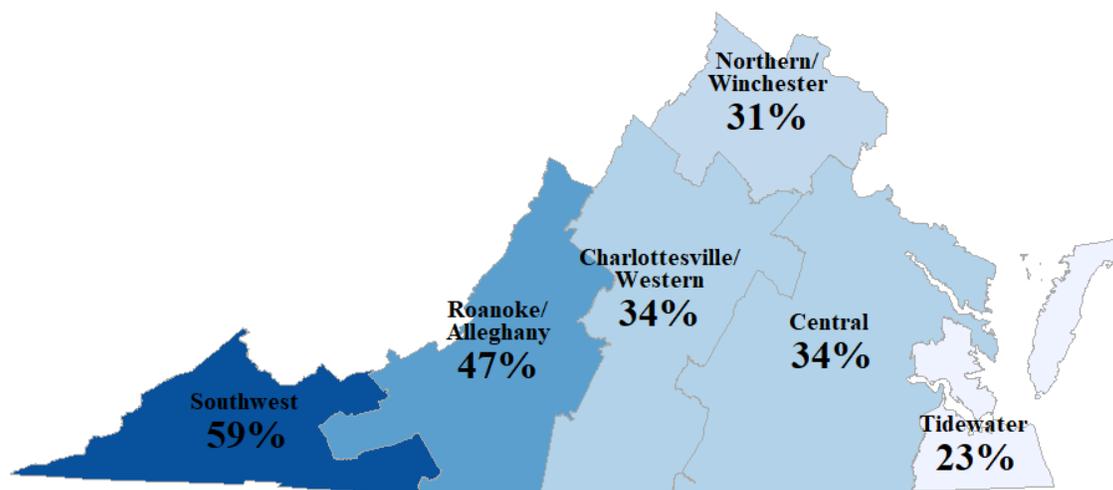
Regional Variation in SUD Diagnosis and Treatment

There is a two-fold or higher difference across Virginia regions in prevalence and treatment of SUD among pregnant women. Based on the residence of pregnant women, diagnosed prevalence ranges from 8 percent in the Tidewater and Northern regions to a high of 16 percent in the Southwest region.



Treatment rates among those who were diagnosed also varies considerably across regions (see below), from a low of 23 percent in the Tidewater region to a high of 59 percent in the Southwest region.

SUD Treatment Rates among Women with 6 Months of Continuous Full Medicaid Coverage Prior to Delivery, 2017–2018



Not surprisingly, treatment rates are higher in areas with higher prevalence of disease. Since prevalence is based on diagnosis by a provider, this finding may reflect higher rates of contact with a clinician in these areas.

It is possible that racial disparities in treatment rates may be correlated with these regional differences, as there are regional differences in where white and black pregnant women tend to live. Deliveries by black women were heavily concentrated in regions that tend to have low treatment rates, especially Tidewater and Central regions (accounting for 38 percent and 34 percent of deliveries, respectively, for black women with SUD, see below). By contrast, relatively few deliveries for black women were in the Roanoke/Alleghany and Southwest regions of the state (6 percent and 0.4 percent, respectively), where treatment rates tend to be higher.

However, racial disparities in treatment rates remain even within regions that have high treatment rates overall. In Roanoke/Alleghany and Southwest regions combined, treatment rates were 56 percent for white women with SUD, compared to 23 percent for black women. For the Tidewater region, treatment rates were 31 percent for white women and 16 percent for black women. This indicates that low treatment rates among black women do not reflect regional differences in diagnosis and treatment of SUD but are likely associated with other systematic barriers to care.

Prevalence and treatment of substance use disorders by race/ethnicity and region

	White	Black
Number of live deliveries in 2017 and 2018*	24,630	19,160
Percent of live deliveries by region		
Statewide	100%	100%
Tidewater	16%	38%
Central region	20%	34%
Charlottesville/Western Region	16%	11%
Northern/Winchester	21%	12%
Roanoke/Alleghany	15%	6%
Southwest	12%	0.4%
SUD treatment rate		
Statewide	44%	20%
Tidewater	31%	16%
Central region	44%	24%
Charlottesville/Western Region	40%	23%
Northern/Winchester	35%	19%
Roanoke/Alleghany/Southwest	56%	23%

*Includes deliveries for women with 6 or more months of continuous full Medicaid coverage prior to delivery.

Outcomes of delivery and childbirth

Neonatal Abstinence Syndrome. Opioid use and treatment with opioid agonist therapy during pregnancy can result in symptoms of drug withdrawal among newborns, known as neonatal abstinence syndrome (NAS). This can lead to additional neonatal health concerns and costly health services. Nationally, Medicaid covers more than 80 percent of NAS-related births.¹⁶ Incidence of NAS among Medicaid covered births increased more than five-fold between 2004 and 2014 and is 7 times higher than NAS incidence among births covered by private insurance.¹⁶

Among Medicaid covered live births in Virginia for 2017 and 2018, a total of 2,800 had a diagnosis of NAS within one year of birth, comprising 3.7 percent of live births.

Neonatal Abstinence Syndrome diagnoses (up to 1 year after birth)

	2017–18
Number of live births with NAS diagnosis within 1 year of birth*	2,800
NAS diagnoses as a percent of live births	3.7%

*Reflects any NAS diagnosis in the 12 months after birth

Substance use disorders among pregnant women with non-live deliveries. There is evidence that SUD during pregnancy is associated with other negative birth outcomes, such as increased risk of miscarriage and stillbirth.¹⁷ In 2017 and 2018, there were 9,260 non-live delivery events for Virginia women with continuous Medicaid coverage, such as miscarriages, stillbirths, ectopic pregnancies, and pregnancy terminations.ⁱⁱ Diagnosed prevalence of SUD was similar for women with non-live deliveries and live deliveries (10 percent). Overall treatment rates for SUD were also similar for women with live and non-live deliveries (36 percent and 35 percent, respectively), although OUD treatment rates were somewhat lower for women with non-live deliveries (63 percent) compared to women with live deliveries (70 percent). This analysis did not examine maternal treatment rates associated with NAS and is limited in reporting additional birth outcomes due to limitations of available administrative data.

Diagnosis and treatment for substance use disorders, live and non-live deliveries

	Live deliveries	Non-live deliveries
Number of deliveries in 2017 and 2018 with 6 or more months of full Medicaid coverage prior to delivery	46,500	9,260
Substance use disorders	4,649	926
Percent any SUD diagnosis	10%	10%
SUD treatment rate	36%	35%
Opioid use disorder	1,395	370
Percent any OUD diagnosis	3%	4%
OUD treatment rate	70%	63%

Conclusion

In 2017 and 2018, about one in 10 pregnant women enrolled in Medicaid had a diagnosed SUD at some time in the year prior to delivery. Three percent of Medicaid enrolled pregnant women had a diagnosis of OUD, while 6 percent had a diagnosis for substance use other than opioids and alcohol, such as cannabinoids, cocaine, and stimulants. These results are broadly comparable to prior reports of the prevalence of SUD among pregnant women in other state Medicaid programs.⁹ In addition, diagnosed prevalence of SUD among pregnant women in Virginia increased slightly from 10 percent in the first half of 2017 to 11 percent in the second half of 2018, while diagnosed prevalence of OUD did not change.

Treatment rates for pregnant women with SUD vary widely by type of substance. Overall, more than one-third (36 percent) of pregnant women with a SUD received some type of treatment in the 12 months prior to their delivery. However, treatment rates ranged from 70 percent among pregnant women with OUD, 30 percent for AUD and only 17 percent for substances other than opioids or alcohol. OUD treatment rates for pregnant women are similar to those from another

ⁱⁱ The federal Hyde Amendment, passed in 1977, bans state use of federal Medicaid dollars to pay for abortions unless the pregnancy is the result of rape or incest, or the abortion is "necessary to save the life of the woman."

study based on three state Medicaid programs.⁹ However, treatment rates for other substances are much lower in Virginia compared to these other states (52 percent treatment rates for substances other than opioids in other states).⁹

In addition to low treatment rates for non-opioid addictions, there are considerable disparities in treatment by race. Overall SUD treatment rates for black women who gave birth (20 percent) are less than half that for white women with SUD (44 percent). Fewer black women are diagnosed with SUD compared to white women, which is inconsistent with nationally representative data that self-reported problems with alcohol or drug use are similar between the two populations of women. Moreover, racial disparities in treatment remain even after accounting for regional differences in residency.

Other factors not observed in this report may account for racial disparities in diagnosis and treatment, such as the severity of addiction and the presence of other co-occurring mental or physical health problems. Mistrust of the health care system, stigma associated with substance use, and fear of child welfare actions likely play significant roles in the care pregnant women seek for SUD but may play a larger role in discouraging treatment among black women.

Author Statement: This brief was prepared by Erin Britton, MPH, and Peter Cunningham, PhD, at Virginia Commonwealth University, Department of Health Behavior and Policy. Other members of the ARTS evaluation team who contributed to this report include Heather Saunders, MSW, and Andrew Barnes, PhD. The evaluation team would like to thank the Department of Medical Assistance Services for providing technical support and reviewing earlier drafts of this report.

Disclaimer: The conclusions in this report are the authors,' and no official endorsement by the VCU School of Medicine or the Virginia Department of Medical Assistance Services is intended or should be inferred.

References

- ¹ Haight SC, Ko JY, Tong VT, et al. Opioid Use Disorder Documented at Delivery Hospitalization – United States, 1994-2014. *Morbidity and Mortality Weekly*. August 10, 2018. https://www.cdc.gov/mmwr/volumes/67/wr/mm6731a1.htm?s_cid=mm6731a1_w
- ² Patrick SW, Davis MM, Lehmann CU, Cooper WO. Increasing incidence and geographic distribution of neonatal abstinence syndrome: United States 2009 to 2012. *J Perinatol* 2015;35:650-655.
- ³ Maeda A, Bateman BT, Clancy CR, et al. Opioid abuse and dependence during pregnancy: temporal trends and obstetrical outcomes. *Anesthesiology* 2014;121:1158-65.
- ⁴ Stone, R. Pregnant women and substance use: Fear, stigma, and barriers to care. *Health & Justice*. 2015; 1(3): 1–15.
- ⁵ Angelotta C, Weiss CJ, Angelotta JW, Friedman RA. A moral or medical problem? The relationship between legal penalties and treatment practices for opioid use disorders in pregnant women. *Women's Health Issues*. 2016; 26(6): 595–601.
- ⁶ Estimates from the Virginia Department of Medical Assistance Services.
- ⁷ Medicaid and CHIP Payment and Access Commission. *Access in Brief: Pregnant Women and Medicaid*. Nov. 2018. <https://www.macpac.gov/wp-content/uploads/2018/11/Pregnant-Women-and-Medicaid.pdf>
- ⁸ Centers for Medicare and Medicaid Services. *Core Set of Adult Health Care Quality Measures for Medicaid (Adult Core Set). Technical Specifications and Resource Manual for Federal Fiscal Year 2019 Report*. (February, 2019). <https://www.medicare.gov/medicaid/quality-of-care/downloads/medicaid-adult-core-set-manual.pdf>
- ⁹ Clemans-Cope, L. Lynch V., Howell, E., et al. Pregnant women with opioid use disorder and their infants in three state Medicaid programs in 2013-2016. *Drug and Alcohol Dependence*. 195 (2019): 156-163.
- ¹⁰ ICD-10-CM codes used to define opioid use disorder include codes for abuse, dependence, and acute poisoning: F11.xx, T40.0x-T40.4x, T40.6x. Codes used to define substance use disorder (SUD) include opioid use disorder codes and were selected similarly with the addition of related medical sequelae, such as alcohol induced pseudo-Cushing's Syndrome. SUD codes include: E24.4, F10.xx-F19.xx, F55.x, G31.2, G62.1, G72.1, I42.6, K29.2x, K70.x, K85.2, K86.0, O35.5x, O99.x, T40.x.
- ¹¹ American Society of Addiction Medicine. <https://www.asam.org/resources/the-asam-criteria/about>

¹² Cunningham, P., Mueller M., Britton E., et al. Addiction and Recovery Treatment Services: Access and Utilization During the Second Year (April 2018 – March 2019). (February, 2020). <https://hbp.vcu.edu/media/hbp/policybriefs/pdfs/FinalARTS2yearreport.Feb2020.pdf>.

¹³ Analysis of National Survey of Drug Use and Health, obtained through the Substance Abuse and Mental Health Data Archive, Restricted Use Data Analysis System. <https://rdas.samhsa.gov/#/>

¹⁴ The American College of Obstetricians and Gynecologists. ACOG Committee Opinion. (August, 2017). <https://www.acog.org/Clinical-Guidance-and-Publications/Committee-Opinions/Committee-on-Obstetric-Practice/Opioid-Use-and-Opioid-Use-Disorder-in-Pregnancy?IsMobileSet=false>

¹⁵ Peterson, E., Davis N.L., Goodman D., et al. *Vital Signs: Pregnancy-Related Deaths, United States, 2011–2015, and Strategies for Prevention, 13 States, 2013–2017*. Center for Disease Control and Prevention. Morbidity and Mortality Weekly Report. (May, 2019). https://www.cdc.gov/mmwr/volumes/68/wr/mm6818e1.htm?s_cid=mm6818e1_w

¹⁶ Winkelman TNA, Villapiano N, Kozhimannil KB, Davis MM, Patrick SW. Incidence and Costs of Neonatal Abstinence Syndrome Among Infants with Medicaid: 2004-2014. *Pediatrics* 2018; 141(4) <https://pediatrics.aappublications.org/content/141/4/e20173520>.

¹⁷ Forray A. Substance use during pregnancy. *F1000Res*. 2016;5:F1000 Faculty Rev-887. Published 2016 May 13. doi:10.12688/f1000research.7645.1.