Vermont Legislative Joint Fiscal Office

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ISSUE BRIEF

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Births in Vermont Affected by the Opioid Epidemic

In 2013, Vermont had the highest rate of hospital deliveries to mothers with opioid use disorder in the country. It also had one of the highest rates of babies born with opioid exposure. But wide availability of the state's effective opioid treatment program protects many of those newborns from the consequences of opioid withdrawal.

Of the babies born to moms with opioid use disorder in Vermont, a smaller proportion were assigned the code for possible opioid symptoms than in other states, and babies affected by opioids showed no signs of developmental delay by 12 months of age. Vermont's hub-and-spoke treatment program is likely responsible for those outcomes.

Key points

- In 2013, the most recent year for which comparable data exists, about 51 in 1,000 hospital deliveries in Vermont, or about 5 percent, were to mothers with opioid use disorder.
    - Among the 27 states with comparable data, Vermont's rate was the highest and almost nine times the U.S. rate of 5.7 per 1,000.
    - In Vermont, about 85 percent of those new mothers with opioid use disorder were on Medicaid. Nationwide, about 80 percent were on Medicaid.
    - 65 percent of new mothers with opioid use disorder and hospital births in Vermont gave birth to babies who were assigned the code for Neonatal Abstinence Syndrome (NAS). That rate in Kentucky and West Virginia was closer to 100 percent.

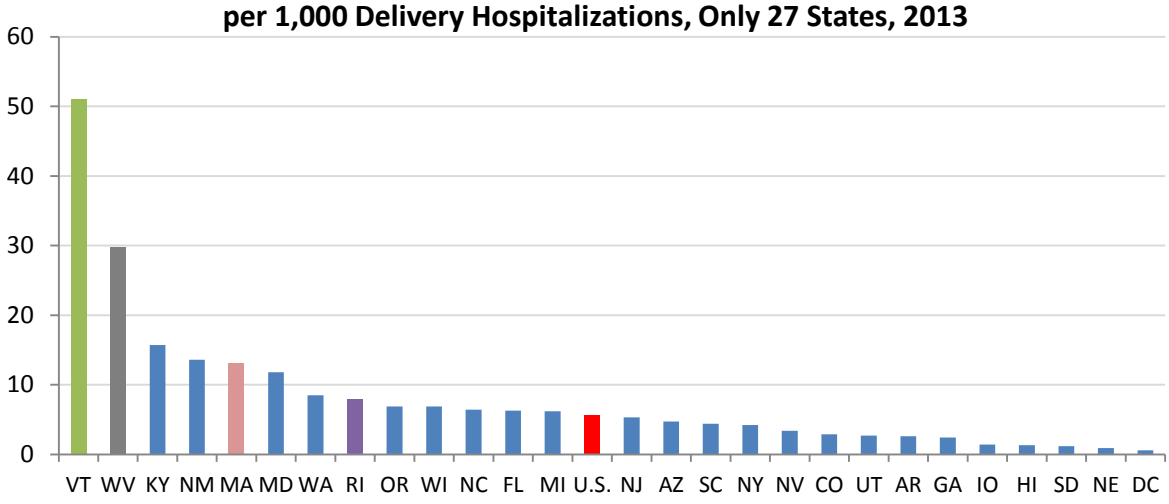
- Also in 2013, about 33 in 1,000 babies born to Vermont residents in Vermont hospitals, or about 3 percent, were assigned the medical code for Neonatal Abstinence Syndrome (NAS), reflecting exposure to opioids before birth, the need for monitoring, and, in some cases, treatment.
    - That rate was more than five times the U.S. rate of 6 per 1,000 hospital births. Among 21 states with comparable data, only the rate in West Virginia was slightly higher than the rate in Vermont.
    - Since 2013, the rate appears to have leveled off; it was 34 per 1,000 in 2015.

- For babies assigned the NAS code in Vermont in 2013, both the length of hospital stay and hospital charges for the stay were lower than nationwide averages for NAS babies, likely reflecting the treatment protocol at the University of Vermont Medical Center where the drug buprenorphine allows shorter stays and lower charges.
    - Moreover, only about 15 percent of newborns assigned the NAS code in Vermont needed treatment for withdrawal symptoms in contrast to the national average of about 50 percent.

Moms with Opioid Use Disorder Who Give Birth

In 2013, the most recent year for which comparable data are available across states, the rate of Vermont residents with opioid use disorder who gave birth in Vermont hospitals was the largest among the 27 reporting states at 51.1 per 1,000 hospital deliveries (see Figure 1).[1] Not all mothers with opioid use disorder give birth to babies afflicted with NAS, but most do. Among the 27 states that reported data for 2013, the next highest rate of moms giving birth with opioid use disorder was in West Virginia at 29.8 per 1,000 hospital deliveries.

Figure 1. Rate of Opioid Use Disorder in Mothers per 1,000 Delivery Hospitalizations, Only 27 States, 2013



Source: Centers for Disease Control and Prevention, 2018; Denominator is state in-hospital births excluding transfers from another acute care hospital or healthcare facility.

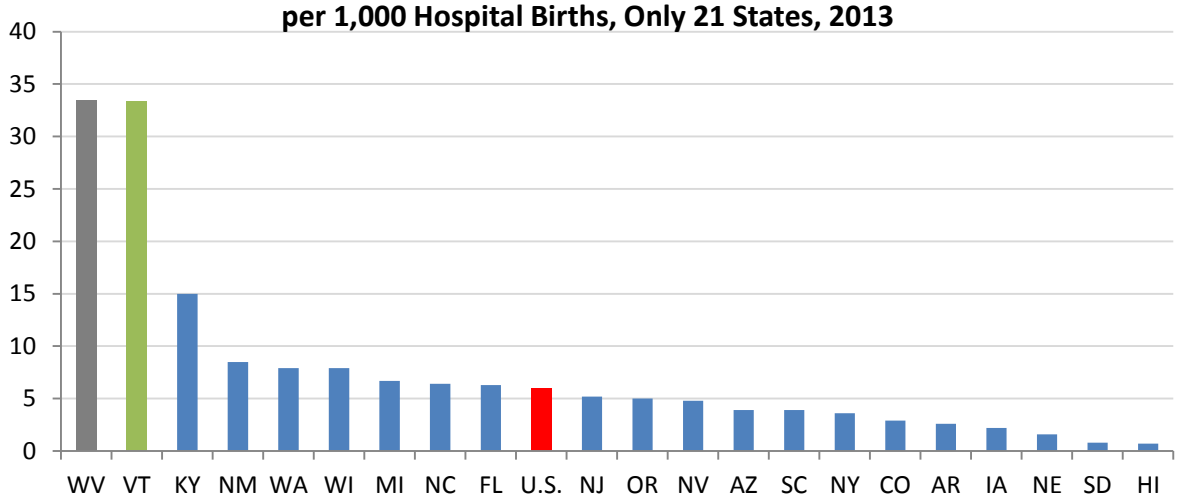
As discussed below, the rate of moms giving birth with opioid use disorder may be high in Vermont because the income threshold for pregnant moms seeking Medicaid is relatively high, treatment has been readily available, and the treatment methodology is known to be highly effective.

[1] Centers for Disease Control and Prevention, "Opioid Use Disorder Documented at Delivery Hospitalization -- United States, 1999-2014," *Morbidity and Mortality Weekly Report*, August 10, 2018. Many states do not report, and it is difficult to know if consistent standards are used when assigning the code for opioid use disorder to mothers. Nevertheless, both the CDC and Vermont Department of Health view the CDC data as being the most reliable when comparing rates across states.

Babies Born with Opioid Exposure

In 2013, the most recent year for which comparable data are available across states, the rate of babies born to Vermont residents in Vermont hospitals and having the medical code for Neonatal Abstinence Syndrome (NAS) was 33.3 per 1,000 hospital births.[2] The NAS code may be assigned to newborns following exposure to opioids in utero; it reflects the need to monitor for physical withdrawal symptoms and, in some cases, treatment for those symptoms. If that rate applied to all births to Vermonters in 2013, 198 babies would have been assigned the NAS code. Vermont's rate was more than five times the U.S. rate of 6.0 per 1,000 hospital births in 2013 (see Figure 2). Among the 21 states with comparable data for 2013, only the rate in West Virginia was slightly higher at 33.4 per 1,000 hospital births.

Figure 2. Rate of Newborns Who Were Assigned the NAS Code per 1,000 Hospital Births, Only 21 States, 2013



Source: Centers for Disease Control and Prevention, 2016.

From 2013 to 2015, Vermont's rate of newborns assigned the NAS code appears to have leveled off. The Vermont Department of Health released a highly informative brief in April 2017.[3] Based on a slightly broader definition of NAS and all births in Vermont hospitals regardless of state of residence, Vermont's rate of babies assigned NAS codes increased a bit in 2014 but was approximately stable in 2015. Moreover, the same brief reported that Medicaid covered about 85 percent of births assigned the NAS code in Vermont in 2013, or about 168 if applied to all

[2] Centers for Disease Control and Prevention, "Incidence of Neonatal Abstinence Syndrome – 28 States, 1999-2013," *Morbidity and Mortality Weekly Report*, August 12, 2016. Again, it is difficult to know if consistent standards are used when assigning the code for Neonatal Abstinence Syndrome to newborns. Nevertheless, both the CDC and Vermont Department of Health view the CDC data as being the most reliable rates available when comparing rates across states.

[3] Vermont Department of Health, "Neonates Exposed to Opioids in Vermont," April 2017; http://www.healthvermont.gov/sites/default/files/documents/pdf/ADAP_Opioids_Neonate_Exposure.pdf.

Vermont newborns. Nationwide, about 80 percent of births assigned the NAS code were covered by Medicaid.[4] Vermont likely covers a higher share of births assigned the NAS code than the U.S. average because the State's income eligibility threshold for pregnant women is more generous than in many states. Among all births in Vermont hospitals, Medicaid covered about 43 percent or 2,572 births (see Table 1).

Table 1. Insurance Coverage for All Births and NAS Births in Vermont Hospitals, 2013

	All Births	NAS Births (3.3% of all births)
Medicaid	43%	85%
Other	57%	15%

Source: Vermont Department of Health

The Department of Health recently completed a one-year project funded by the March of Dimes and the Centers for Disease Control and Prevention to estimate the incidence of Neonatal Abstinence Syndrome in 2015 using a standard definition. The study found that 88.8% of the mothers of infants assigned the NAS code were on medication-assisted treatment during pregnancy, pointing to the high treatment rate of women with opioid use disorder in Vermont.

The Length of Hospital Stay and Hospital Charges for Opioid-Exposed Babies

Both the length of the hospital stay following birth and hospital charges are higher for opioid-exposed babies than for others. Opioid-exposed babies are often monitored for four days in the hospital to catch signs of opioid withdrawal. In 2013, babies with the NAS code at Vermont hospitals stayed in the hospital for 6.3 days on average, while those without the NAS code stayed 2.8 days.[5] In 2013, hospital charges in Vermont for babies with the NAS code were $15,162 on average; charges for babies without the NAS code were $5,587.[6] Between 2011 and 2014, mean hospital costs nationwide for an infant with the NAS code covered by Medicaid were over fivefold higher than for an infant without NAS ($19,340 per birth vs $3700 per birth).[7] In addition, infants with NAS who were covered by Medicaid or private insurance had hospital stays that were more than four times longer than infants without NAS who were

[4] https://www.medicaid.gov/federal-policy-guidance/downloads/cib060818.pdf

[5] The Vermont Department of Health recently identified a methodological problem with the data for babies assigned the NAS code that would increase the length of the stay and hospital charges slightly for those babies. The problem is that the data excluded newborns who are transferred to UVM Medical Center from other hospitals.

[6] Again, see Vermont Department of Health, *Neonates Exposed to Opioids in Vermont*, April 2017.

[7] Winkelman T.N.A., Villapiano N, Kozhimannil KB, et al. "Incidence and Costs of Neonatal Abstinence Syndrome Among Infants With Medicaid: 2004–2014." *Pediatrics.* 2018;141(4):e20173520.

covered by Medicaid.[8] Hospital charges may not represent payments or costs, but they are a stand-in for those measures.

For over 15 years, Vermont has recognized the importance of recognition, diagnosis and treatment of opioid use disorder in pregnancy. UVM Medical Center has been a key player in the MOTHER study, a long-term analysis of best practices for treating pregnant women and their babies. In 2012, the Vermont Legislature authorized the hub-and-spoke program that integrates substance use treatment into primary care. Most recently, the Improving Care for the Opioid-exposed Newborn (ICON) project brings together the Vermont Department of Health and the University of Vermont Children's Hospital to improve health outcomes for opioid-exposed newborns. Improved health outcomes are achieved by providing educational sessions on up-to-date recommendations and guidelines to health care professionals who provide care for opioid-dependent pregnant women and their infants.

Vermont's shorter hospital stays and lower charges for babies assigned the NAS code may be explained largely by the protocol adopted at the University of Vermont (UVM) Medical Center for the treatment of pregnant moms with opioid use disorder and their newborns. At the time of the birth of the first baby with opioid exposure in Vermont in 2000, the UVM Medical Center—then Fletcher Allen Health Care—was the only hospital in the state equipped to handle births to moms with opioid use disorder; medical personnel sent the new mom home on methadone, the only drug available for treatment at the time. When the drug buprenorphine became available in 2004, medical personnel chose to treat pregnant moms with opioid use disorder using buprenorphine rather than methadone, in part to allow new moms from far corners of the state to return home as soon as possible. For the babies, UVM Medical Center personnel chose a methadone taper that could be dosed at home rather than a morphine taper that required continued hospitalization, again in part to allow the babies to go home sooner after birth.

The same treatment protocols continue at UVM Medical Center today, allowing both moms and babies to return home sooner than in most other parts of the country where morphine tapers for newborns and methadone for new moms require longer hospital stays (see Table 2). Moreover, recent evidence confirmed that the incidence and severity of NAS are lower in infants exposed in utero to buprenorphine or heroin compared with those exposed in utero to methadone.[9] In 2012, for example, only about 15 percent of opioid-exposed babies required home-based methadone tapers to alleviate clinically significant NAS symptoms in Vermont, significantly lower than the national average of about 50 percent.[10] Such a low rate is of special

[8] Again, see Winkelman et al., 2018.
[9] Hudak, Mark L. and Rosemarie C. Tan. "Neonatal Drug Withdrawal," *Pediatrics*, 2012 (revised); http://pediatrics.aappublications.org/content/129/2/e540
[10] Anne Johnston MD, UVMMC, "Improving Care for the Opioid-Exposed Newborn: The Vermont Experience," presentation for the House Human Services Committee, January 28, 2014. https://legislature.vermont.gov/assets/Documents/2014/WorkGroups/House%20Human%20Services/Opioid%20A

interest given the increased risk of behavioral problems, hearing and vision problems, motor problems, cognitive issues, and hyperactivity for babies with NAS. In fact, infants followed by UVM Medical Center as part of the MOTHER study had no increased developmental delay at around 12 months of age.[11]

Table 2. Protocols for Pregnant Moms and Newborns		
	Drug Used	Length of Hospital Stay
Moms with opioid use disorder giving birth		
UVM Medical Center	Buprenorphine	Shorter
Most Hospitals, including VT Community Hospitals	Methadone	Longer
Newborns needing treatment for NAS		
UVM Medical Center	Methadone taper	Shorter
Most Hospitals, including VT Community Hospitals	Morphine taper	Longer

A focus of medical personnel in recent years concerns the trade-off between providing care and birthing facilities at the state's most advanced medical center versus keeping the new mom and baby close to family and friends. Best clinical practice suggests new moms are better off when kept close to home, and what is best for new moms is generally best for newborns as well. In recent years, some community hospitals in Vermont have begun to offer services to pregnant moms with opioid use disorder. Because the community hospitals feel more comfortable offering the morphine taper for newborns and methadone for new moms, the length of hospital stays and hospital charges for newborns assigned the NAS code in Vermont are expected to increase.

Importance of Treatment Programs

Vermont's easily accessible and effective opioid treatment programs through its hub-and-spoke system may be responsible for three relatively good outcomes in Vermont. The first two affect pregnant moms and their babies, and the third concerns drug overdose fatalities in general. First, a smaller proportion of mothers with opioid use disorder gave birth to babies assigned the

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[11] Testimony of Dr. Anne Johnston, House Human Services Committee, January 28, 2014. The MOTHER study is the Maternal Opioid Treatment: Human Experimental Research project.

NAS code in Vermont than in other states with comparable data. Second, babies assigned the NAS code in Vermont showed no signs of developmental delay by 12 months of age, as discussed above.

A smaller proportion of Vermont mothers with opioid use disorder gave birth to babies assigned the NAS code in 2013 than in other states with well-known opioid use issues. In Vermont, only 65 percent of moms with opioid use disorder gave birth to babies assigned the NAS code. In Kentucky, 96 percent of moms with opioid use disorder gave birth to babies assigned the NAS code. In West Virginia, the number of NAS babies was larger than the number of moms with opioid use disorder who gave birth at a ratio of 112 percent, perhaps suggesting some undercount of moms with opioid use disorder.[12] Vermont's substantially lower ratio suggests that effective treatment protocols resulted in fewer moms with opioid use disorder giving birth to NAS babies.

Vermont makes medication assisted treatment available throughout the state using its hub-and-spoke model, and Vermont's Medicaid eligibility rules allow more pregnant moms to access treatment. The hub-and-spoke system uses medications such as methadone and buprenorphine as part of a comprehensive opioid use disorder treatment program that includes counseling. Such treatment is not the only approach for opioid use disorder, but it is the most effective treatment for most people. And it is the treatment recommended for pregnant women by the American College of Obstetricians and Gynecologists.[13] According to their website, medication assisted treatment "improves adherence to prenatal care and addiction treatment programs and has been shown to reduce the risk of pregnancy complications. And while neonatal abstinence syndrome is often seen in infants who have been exposed prenatally to opioids, it is important to remember that it is an expected and treatable condition that has not been found to have any significant effect on cognitive development."

Vermont's income threshold for Medicaid for pregnant moms in 2013 was 200 percent of the federal poverty level.[14] That put Vermont in the top 17 states ranked by Medicaid income eligibility for pregnant women. The federal income threshold was 133 percent of the federal poverty level; in West Virginia, the income threshold was 150 percent of the federal poverty level.

[12] Another way to see this is that Vermont's rate of OUD mothers with hospital deliveries is 70 percent higher than West Virginia's rate. However, Vermont and West Virginia had similar rates of NAS babies per 1,000 hospital deliveries. If mothers with OUD in Vermont had given birth to babies with NAS at the same rate as in West Virginia, Vermont would have had 57.1 babies with NAS per 100,000 hospital births rather than 33.3 per 100,000.

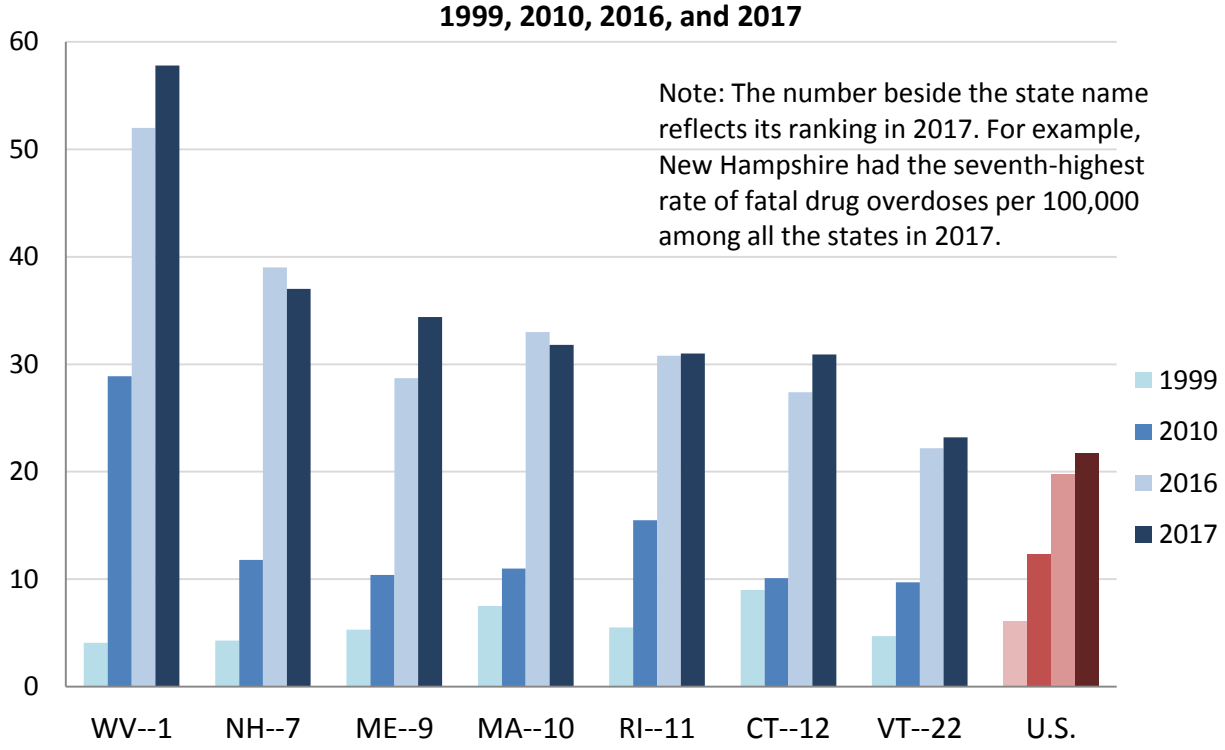
[13] "Medication-Assisted Treatment Remains the Recommended Therapy for Pregnant Women," July 26, 2017. https://www.acog.org/About-ACOG/News-Room/News-Releases/2017/Medication-assisted-Treatment-Remains-the-Recommended-Therapy--for-Pregnant-Women

[14] In 2018, Vermont's income threshold is 213 percent of the federal poverty level.

Additional Information on the Effectiveness of Vermont's Treatment Program

In 2017, Vermont was the only New England state with a fatal drug overdose rate close to the national average, suggesting that Vermont's hub-and-spoke system provides valuable public health benefits (see Figure 3). In 1999, most of the New England states and West Virginia had fatal drug overdose rates below the national average. Increases in fatal drug overdoses in 2010, 2016, and 2017 were largely due to opioids. In 2017, Vermont's rate of fatal drug overdoses was 23.2 per 100,000; the nationwide rate was 21.7 per 100,000. Rates in other New England states ranged from 30.9 in Connecticut to 37.0 in New Hampshire. West Virginia had the highest rate at 57.8 per 100,000. In light of the pervasive damage stemming from the opioid epidemic in New England during recent years, the ability of Vermont to keep its rate close to the nationwide average is noteworthy.

Figure 3: Age-Adjusted Rates of Fatal Drug Overdoses per 100,000; 1999, 2010, 2016, and 2017



Source: The Henry J. Kaiser Family Foundation, "Opioid Overdose Death Rates and All Drug Overdose Death Rates per 100,000 Population (Age-Adjusted)," 1999-2016; National Center for Health Statistics, National Vital Statistics System, Mortality, 2017.