

# Neonatal Abstinence Syndrome (NAS)

## DATA BRIEF: STATEWIDE AND COUNTY TRENDS, 2012-2020

### Background

Neonatal abstinence syndrome (NAS) is a postnatal drug withdrawal syndrome caused by a sudden discontinuation of fetal exposure to substances used or misused by the parent during their pregnancy (Kocherlakota, 2014; Winkelman, Villapiano, Kozhimannil, Davis, & Patrick, 2020). It is primarily caused by in utero exposure to opioids, although it is not always possible to attribute the cause of NAS to opioids alone (McQueen & Murphy-Oikonen, 2016). The incidence of NAS in the United States increased from 2.9 per 1,000 hospital births in 2009 to 7.3 per 1,000 hospital births in 2017 (Healthcare Cost and Utilization Project, 2021). It is estimated that between 55% and 94% of newborns whose parent was either addicted to or treated with opioids while pregnant will develop NAS (McQueen & Murphy-Oikonen, 2016).

NAS cases range from mild to severe with some more severe cases requiring intensive care and pharmacological interventions (Kocherlakota, 2014). Signs and symptoms of NAS generally include tremors, irritability, excessive crying, and diarrhea (Kocherlakota, 2014). As NAS cases can be mild, not all infants exposed to opioids or other substances in utero are diagnosed with NAS (McQueen & Murphy-Oikonen, 2016).

The identification of infants at risk for NAS includes assessing the pregnant person’s history of substance use, the pregnant person and infant toxicological results, and monitoring for symptom manifestation after birth (Jilani, Frey, Pepin, & et al, 2019). Nationally, in 2019, about 7% of women reported using prescription opioids during pregnancy (Centers for Disease Control and Prevention, 2020). Related estimates find one in five women report opioid misuse, defined as obtaining and using opioids from a source outside of the healthcare system that were not prescribed to them, including the use of illicit opioids (i.e., heroin and fentanyl) (Centers for Disease Control and Prevention, 2020). Estimating infants exposed to opioid use during pregnancy is challenging. Taken together, though, estimates indicate a significant population of infants are at risk for NAS.

### NAS Rates in Minnesota

From 2012 to 2020, there were 3,251 NAS hospital-visits in Minnesota (Table 1). This corresponds to a statewide rate of 5.5 per 1,000 live births. The median rate (i.e., the rate in the middle of the overall range of rates for Minnesota counties) among counties in Minnesota was 3.5 per 1,000 live births.

**Table 1: Following a relatively stable number of NAS hospital-visits from 2015 to 2019, NAS hospital-visits slightly increased in 2020.**

Year	Number of Hospital-visits	Rate per 1,000 live births
2012	231	3.5
2013	317	4.8
2014	375	5.6
2015	458	6.8
2016	396	5.9

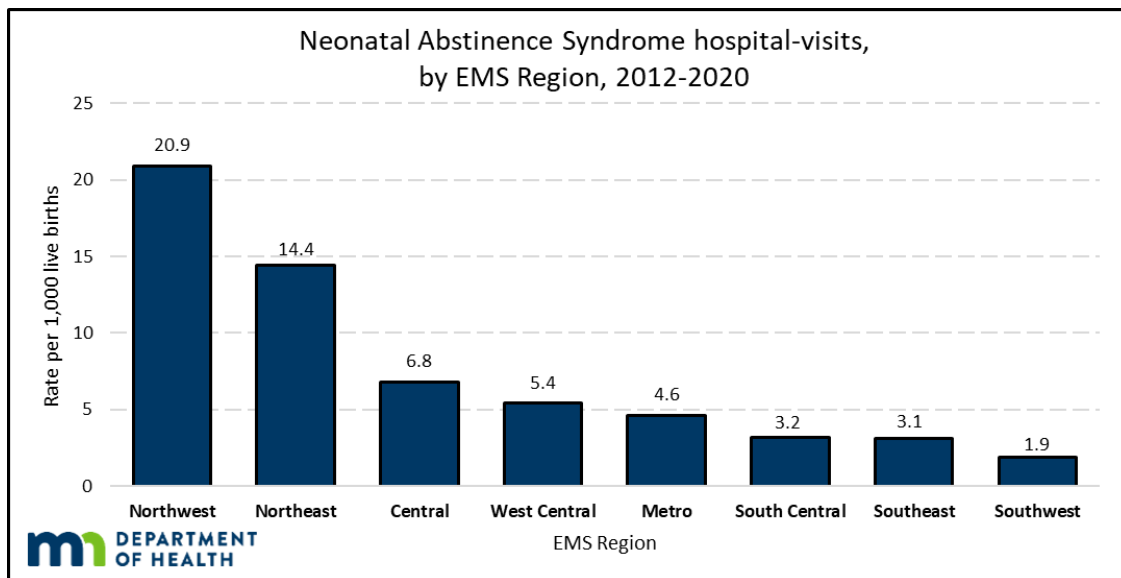
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Year	Number of Hospital-visits	Rate per 1,000 live births
2017	431	6.6
2018	320	4.9
2019	342	5.4
2020	381	6.3
<b>Total</b>	<b>3,251</b>	<b>5.5</b>

SOURCE: Hospital Discharge Data, Injury and Violence Prevention Section, Minnesota Department of Health, 2012-2020

Examining the NAS data by EMS region, the highest rate was found in the Northwest region, with a rate of 20.9 per 1,000 live births (311 NAS hospital-visits between 2012 and 2020) (data by region are available in Appendix I). The lowest rate was found in the Southwest region of the state with a rate of 1.9 per 1,000 live births (42 NAS hospital-visits between 2012 and 2020). However, the largest number and greatest proportion of NAS hospital-visits occurred in the Metro region (1,607 NAS hospital-visits; 49% of the total 3,251 hospital-visits from 2012 to 2020). The rate for the Metro region, however, was the fifth highest among all regions (Figure 1). Rates also varied among counties within regions and further data are available by county in Appendix II.

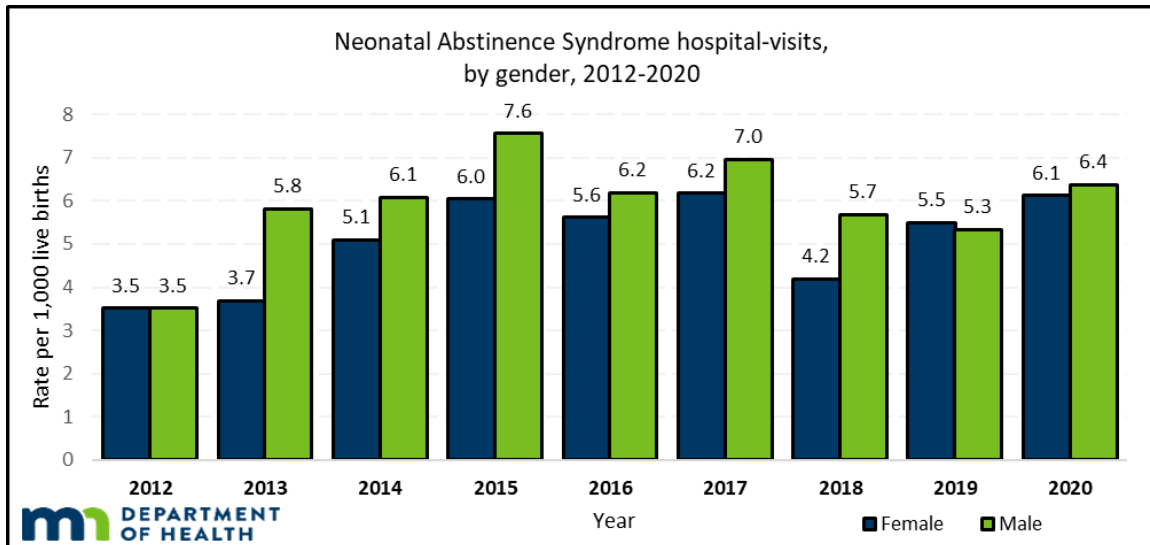
**Figure 1: The NAS hospital-visits rate varied by Minnesota EMS region from 2012-2020, with the rate considerably higher in the Northwest Region.**



SOURCE: Hospital Discharge Data, Injury and Violence Prevention Section, Minnesota Department of Health, 2012-2020

Of the total number of NAS hospital-visits from 2012 to 2020, 55% were male, and the rates of NAS hospital-visits tended to be higher among newborn males than females (Figure 2). Regarding the higher rate of NAS among males, an increased risk of NAS diagnosis among male infants has been found, but not an increased severity of NAS symptoms (Charles, et al., 2017). Further investigation is required as it pertains to understanding this increased risk and translation to prevention and treatment of NAS.

An increase in the rates of NAS was observed from 2019 to 2020 for both males and females. From 2019 to 2020, the hospital-visits rate of newborn males with NAS increased 21% (5.3 to 6.4 per 1,000 live births), while the rate of newborn females increased 11% (5.5 to 6.1 per 1,000 live births).

**Figure 2: The rates of NAS are slightly higher for males than females.**

SOURCE: Hospital Discharge Data, Injury and Violence Prevention Section, Minnesota Department of Health, 2012-2020  
Populations for rates are gender-specific

## Prevention

Preventing NAS is best accomplished by intervening with a pregnant person's potential use during pregnancy. Preventing NAS requires an understanding that substance use is not simply an individual problem but is also shaped by factors such as community and family support, access to healthcare, and healthy relationships. The best method of prevention and treatment of opioid use during pregnancy and NAS is a whole-patient approach that includes a combination of medical, behavioral health, and community supports. Prevention strategies include preventing opioid misuse during pregnancy through changes in prescribing practices, identifying misuse during pregnancy, and connecting to treatment and recovery supports.

Screening, Brief Intervention, and Referral to Treatment (SBIRT) is an evidence-based approach for identifying women with substance use disorder and connecting to treatment if needed. Women using opioids during pregnancy benefit from accessing comprehensive obstetric care that provides medication-assisted treatment (MAT) in addition to health monitoring and referral to recovery services. MAT has been shown to improve a patient's adherence to treatment, reduce illicit opioid use, and support long-term recovery (Pew Charitable Trusts, 2016).

## Treatment

Women receiving treatment for opioid use disorder benefit when there is adequate access to a wide array of recovery supports and resources in the community. Recovery supports are varied and include, but are not limited to, MAT, behavioral health services, adequate and stable housing, family home visiting, and peer support groups (Substance Abuse and Mental Health Services Administration, 2018).

One of the most promising approaches for treatment of NAS is the evidence-based Eat, Sleep, Console (ESC) model of family-centered care (Grossman, Lipshaw, Osborn, & Berkwitt, 2018). The ESC model emphasizes the parent's ability to provide care for their infant to reduce NAS symptoms through breastfeeding, swaddling, and skin-to-skin contact. Initial evaluations of the ESC model have shown a reduction in the length of hospital stays, pharmacological interventions needed for symptom management, and cost associated with infant care (Grossman, Lipshaw, Osborn, & Berkwitt, 2018). Hospitals can adapt policies and protocols to support the ESC model by promoting rooming in, allowing

parents to provide the majority of infant care, and encouraging parents to spend as much time with their infant as possible.

Comprehensive obstetric care that includes MAT can help to reduce the incidence of NAS through management of the amount and type of opioids that a fetus receives in utero. Certain medications used in MAT have been shown to be more effective in reducing the symptoms of NAS, but more research is needed (Grossman, Lipshaw, Osborn, & Berkwitt, 2018). Physicians can receive waivers that allow for the prescription of MAT by completing a brief training. Increasing the number of physicians that are waived to provide MAT will reduce the treatment gap for women who have access to MAT. Nationwide, access to MAT is dependent on several factors, such as where women live and their health insurance coverage. Coverage of services is often more difficult for women living in rural areas and women insured through Medicaid (Pew Charitable Trusts, 2016). These barriers must be addressed to allow women to access the services for their needs and circumstances.

### **NAS Prevention Resources**

Fast Tracker (<https://sud.fasttrackermn.org/>) is a resource developed by the Minnesota Department of Human Services that allows people to search for substance use treatment options.

The Minnesota Hospital Association (<https://www.mnhospitals.org/>) has developed a Neonatal Abstinence Syndrome (NAS) toolkit (<https://www.mnhospitals.org/Portals/0/Documents/patientsafety/Perinatal/Neonatal%20Abstinence%20Syndrome%20Toolkit.pdf>). The toolkit provides information on risk assessment, screening, and treatment of NAS.

The Substance Abuse and Mental Health Services Administration (<https://www.samhsa.gov/>) has developed Clinical Guidance for Treating Pregnant and Parenting Women with Opioid Use Disorder and Their Infants (<https://store.samhsa.gov/product/Clinical-Guidance-for-Treating-Pregnant-and-Parenting-Women-With-Opioid-Use-Disorder-and-Their-Infants/SMA18-5054>). This clinical guidance provides information on promising best practices for the prevention and treatment of maternal opioid use disorder and NAS.

## Methods

All hospitalizations of acute care, non-federal, in-state hospital settings were included in these analyses. Excluded are those with unknown age, out-of-jurisdiction residence, unknown state of residence, non-acute care or federal hospital admission, and admission only for short stays or observation visits. The NAS case definition used aligns with the CSTE position statement for working with hospital discharge data (Council of State and Territorial Epidemiologists, 2019). The International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) code of P96.1 was used to identify NAS hospital-visits from October 2015 forward. Prior to 2015, the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) code of 779.5 was used to identify NAS hospital-visits. Rates were calculated per 1,000 live births among Minnesota residents.

**Note:** The 2019 NAS Data Brief contained errors as a result of using a broader case definition. The information found in the above data brief are correct and consistent with the current CSTE NAS case definition. Additionally, the above data brief contains rates that are calculated per 1,000 live births, a change from the 2019 NAS Data Brief which calculated rates per 10,000 live births.

## References

- Centers for Disease Control and Prevention. (2020). *Data and statistics about opioid use during pregnancy*. Retrieved from Centers for Disease Control and Prevention: <https://www.cdc.gov/pregnancy/opioids/data.html>
- Charles, M. K., Cooper, W. O., Jansson, L. M., Dudley, J., Slaughter, J. C., & Patrick, S. W. (2017). Male Sex Associated With Increased Risk of Neonatal Abstinence Syndrome. *Hospital Pediatrics*, 7(6), 328-334. doi:10.1542/hpeds.2016-0218
- Council of State and Territorial Epidemiologists. (2019). *Neonatal Abstinence Syndrome Standardized Case Definition*. CSTE. Retrieved from [https://cdn.ymaws.com/www.cste.org/resource/resmgr/2019ps/final/19-MCH-01\\_final\\_7.31.19.pdf](https://cdn.ymaws.com/www.cste.org/resource/resmgr/2019ps/final/19-MCH-01_final_7.31.19.pdf)
- Grossman, M., Lipshaw, M., Osborn, R., & Berkowitz, A. (2018). A novel approach to assessing infants with neonatal abstinence syndrome. *Hospital Pediatrics*, 8(1), 1-6. doi:10.1542/hpeds.2017-0128
- Healthcare Cost and Utilization Project. (2021). *Neonatal Abstinence Syndrome (NAS) Among Newborn Hospitalizations*. Retrieved from <https://www.hcup-us.ahrq.gov/faststats/NAServlet?setting1=IP>
- Jilani, S., Frey, M., Pepin, D., & et al. (2019). Evaluation of state-mandated reporting of neonatal abstinence syndrome - six states, 2013-2017. *Morbidity and Mortality Weekly Report*, 68(1), 6-10. doi:10.15585/mmwr.mm6801a2
- Kocherlakota, P. (2014). Neonatal abstinence syndrome. *Pediatrics*, 134(2), e547-e561.
- McQueen, K., & Murphy-Oikonen, J. (2016). Neonatal abstinence syndrome. *New England Journal of Medicine*, 2468-2479.
- Pew Charitable Trusts. (2016). *Medication-assisted treatment improves outcomes for patients with opioid use disorder*. Retrieved from [https://www.pewtrusts.org/-/media/assets/2016/11/medicationassistedtreatment\\_v3.pdf](https://www.pewtrusts.org/-/media/assets/2016/11/medicationassistedtreatment_v3.pdf)
- Substance Abuse and Mental Health Services Administration. (2018). *Clinical guidance for treating pregnant and parenting women with opioid use disorder and their infants*. SAMHSA. Retrieved from <https://store.samhsa.gov/product/Clinical-Guidance-for-Treating-Pregnant-and-Parenting-Women-With-Opioid-Use-Disorder-and-Their-Infants/SMA18-5054>
- Winkelman, T., Villapiano, N., Kozhimannil, K., Davis, M., & Patrick, S. (2020). Incidence and costs of neonatal abstinence syndrome among infants with medicaid: 2004-2014. *Pediatrics*, 141(4). doi:10.1542/peds.2017-3520

## Suggested Citation

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**Appendix I: NAS cases by EMS region,  
Number and Rates (per 1,000 live births), 2012-2020**

	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
EMS Region	N (rate)	N (rate)	N (rate)	N (rate)	N (rate)	N (rate)	N (rate)	N (rate)	N (rate)	N (rate)
Metro	113 (2.9)	171 (4.4)	171 (4.3)	219 (5.5)	167 (4.2)	226 (5.8)	162 (4.3)	171 (4.6)	206 (5.8)	1607 (4.6)
Northwest	12 (6.9*)	23 (13.1)	28 (16.3)	54 (32.3)	55 (32.6)	40 (23.8)	32 (20.4)	28 (17.5)	39 (26.9)	311 (20.9)
Northeast	40 (12.4)	38 (12.0)	42 (13.0)	48 (15.2)	51 (16.2)	42 (13.3)	47 (15.9)	44 (14.5)	48 (17.3)	400 (14.4)
West Central	9 (5.2*)	17 (9.8*)	15 (8.3*)	6 (3.4*)	6 (3.3*)	12 (6.8*)	6 (3.5*)	7 (4.1*)	6 (3.8*)	84 (5.4)
Central	35 (3.9)	43 (4.7)	71 (7.9)	80 (8.7)	91 (9.8)	69 (7.7)	46 (5.1)	58 (6.6)	55 (6.3)	548 (6.8)
Southwest	3 (1.2*)	3 (1.2*)	6 (2.5*)	5 (1.9*)	6 (2.4*)	4 (1.6*)	4 (1.6*)	3 (1.3*)	8 (3.5*)	42 (1.9)
South Central	5 (1.6*)	9 (2.8*)	14 (4.2*)	14 (4.3*)	5 (1.5*)	16 (5.1*)	9 (2.7*)	16 (5.1*)	5 (1.7*)	93 (3.2)
Southeast	14 (2.5*)	13 (2.3*)	28 (4.9)	20 (3.5)	15 (2.6*)	22 (3.9)	14 (2.6*)	15 (2.7*)	13 (2.5*)	154 (3.1)

*\*Rates are considered unreliable when the rate is calculated with a numerator of 20 or less.  
Map of EMS regions available at: [Minnesota EMS Regions](#)*



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**Appendix II: Number of NAS cases by County of Residence, 2012-2020**

County of Residence	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total	Rate per 1,000
Aitkin	0	2	1	0	1	2	1	2	1	10	9.8*
Anoka	8	30	20	30	16	24	18	25	25	167	5.3
Becker	5	9	7	3	4	8	4	4	1	45	14.4
Beltrami	8	7	17	45	40	26	25	19	30	217	37.4
Benton	0	5	7	4	4	3	2	3	1	29	5.9
Big Stone	0	0	0	0	0	0	0	0	1	1	2.3
Blue Earth	1	4	4	5	2	4	3	6	1	30	4.6
Brown	0	2	0	1	0	5	0	0	0	8	3.3*
Carlton	7	12	12	11	6	10	9	10	6	83	25.3
Carver	2	1	2	1	3	3	2	1	3	18	1.7*
Cass	12	5	17	21	35	22	11	10	15	148	54.2
Chippewa	0	0	0	1	1	0	0	3	0	5	3.6
Chisago	4	1	0	4	0	5	1	3	1	19	4.0
Clay	1	1	4	1	0	0	0	1	0	8	30.9*
Clearwater	1	0	1	0	1	2	2	2	2	11	11.5*
Cook	0	1	0	0	0	1	0	0	0	2	5.3*
Cottonwood	0	0	0	0	1	0	1	0	0	2	1.7*
Crow Wing	2	0	5	8	4	4	6	3	4	36	5.8
Dakota	15	23	16	27	16	27	21	18	22	185	4.0
Dodge	0	1	2	1	0	1	0	0	2	7	3.2*
Douglas	1	3	2	0	1	1	1	1	2	12	3.2*
Faribault	1	0	0	1	0	0	1	0	1	4	3.1*
Fillmore	2	0	1	1	0	1	1	0	0	6	3.3*

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County of Residence	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total	Rate per 1,000
Freeborn	0	0	2	0	2	0	2	0	2	8	2.8*
Goodhue	4	4	1	6	0	4	2	0	1	22	4.9
Grant	0	0	0	0	0	0	0	0	1	1	1.7
Hennepin	55	72	86	94	74	101	75	78	91	726	5.0
Houston	0	0	0	0	0	0	0	0	0	0	0
Hubbard	0	3	1	1	3	1	1	0	0	10	5.5*
Isanti	0	2	3	3	3	2	2	3	0	18	4.6*
Itasca	4	3	3	5	7	6	6	4	4	42	10.5
Jackson	0	0	2	0	0	0	0	0	0	2	2.7*
Kanabec	1	0	2	3	1	1	2	0	0	10	7.1*
Kandiyohi	0	2	2	1	2	0	0	0	1	8	1.5*
Kittson	0	0	0	0	0	0	0	0	0	0	0
Koochiching	0	0	1	1	3	3	2	0	2	12	13.6*
Lac Qui Parle	0	0	0	0	0	0	0	0	1	1	2.2*
Lake	0	0	0	0	0	0	0	1	2	3	3.3*
Lake of the Woods	0	0	0	0	0	0	0	0	0	0	0
Le Sueur	0	0	0	2	0	0	0	2	0	4	1.5*
Lincoln	0	0	0	0	0	0	0	0	0	0	0
Lyon	1	0	0	0	0	0	0	0	0	1	0.3*
McLeod	0	0	0	2	0	1	1	2	1	7	5.2*
Mahnomen	1	9	6	6	7	8	2	5	5	49	93.9
Marshall	1	0	0	0	2	0	0	1	0	4	2.4*
Martin	0	0	1	1	0	1	0	3	0	6	1.8*
Meeker	1	0	2	1	1	0	1	2	0	8	3.3*

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County of Residence	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total	Rate per 1,000
Mille Lacs	4	11	18	13	15	9	2	12	7	91	32.3
Morrison	0	2	4	4	5	2	1	3	1	22	6.6
Mower	1	0	1	1	0	3	1	1	0	8	1.8*
Murray	1	0	0	0	0	0	0	0	0	1	1.7*
Nicollet	0	1	6	1	0	2	1	0	0	11	3.4*
Nobles	0	0	0	0	0	0	0	0	1	1	0.4*
Norman	0	0	0	0	0	0	0	0	0	0	0
Olmsted	4	2	8	3	5	1	3	5	5	36	1.9
Otter Tail	1	3	2	2	1	1	0	0	2	12	2.3*
Pennington	0	1	0	1	1	1	0	1	0	5	3.9*
Pine	1	2	1	0	2	6	4	7	7	30	12.9
Pipestone	0	0	0	0	0	0	0	0	0	0	0
Polk	1	3	3	1	1	1	2	0	1	13	9.7*
Pope	1	0	0	0	0	0	0	0	0	1	0.9*
Ramsey	24	27	30	45	41	50	30	33	40	320	4.7
Red Lake	0	0	0	0	0	1	0	0	1	2	5.7*
Redwood	0	0	0	2	2	0	1	0	2	7	4.3*
Renville	1	1	2	0	0	3	1	0	1	9	5.8*
Rice	2	3	3	3	3	3	0	2	1	20	3.1
Rock	0	0	0	0	0	0	0	0	0	0	0
Roseau	0	0	0	0	0	0	0	0	0	0	0
St. Louis	29	20	25	31	31	20	29	27	33	245	14.1
Scott	2	5	5	8	8	5	5	9	11	58	3.6
Sherburne	7	4	3	8	8	6	1	0	4	41	3.9

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County of Residence	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total	Rate per 1,000
Sibley	0	0	0	0	0	1	1	0	2	4	2.7
Stearns	2	6	6	11	10	5	6	10	7	63	3.5
Steele	0	3	6	3	3	5	2	1	0	23	5.9
Stevens	0	1	0	0	0	0	0	0	0	1	1.0*
Swift	0	0	0	1	1	1	0	0	0	3	3.1*
Todd	0	1	0	0	0	0	0	0	2	3	1.1*
Traverse	0	0	0	0	0	1	0	0	0	1	5.5*
Wabasha	0	0	1	0	0	0	1	0	0	2	1.0*
Wadena	0	0	0	0	0	0	0	1	1	2	1.2*
Waseca	2	1	1	0	0	2	1	1	0	8	4.3*
Washington	7	13	12	14	14	16	11	7	15	109	4.4
Watonwan	0	1	0	0	0	0	0	0	0	1	0.7
Wilkin	0	0	0	0	0	1	1	0	0	2	6.1*
Winona	1	0	3	3	2	4	2	1	2	18	5.7*
Wright	2	4	5	3	2	4	8	3	5	36	2.3
Yellow Medicine	0	0	0	0	0	0	1	0	0	1	2.3*
<b>7-county Metro</b>	<b>113</b>	<b>171</b>	<b>171</b>	<b>219</b>	<b>167</b>	<b>226</b>	<b>162</b>	<b>171</b>	<b>201</b>	<b>1607</b>	<b>4.6</b>
<b>Greater MN</b>	<b>118</b>	<b>146</b>	<b>204</b>	<b>227</b>	<b>229</b>	<b>205</b>	<b>158</b>	<b>171</b>	<b>174</b>	<b>1665</b>	<b>6.9</b>
<b>Total</b>	<b>231</b>	<b>317</b>	<b>375</b>	<b>458</b>	<b>396</b>	<b>431</b>	<b>320</b>	<b>342</b>	<b>381</b>	<b>3272</b>	<b>5.6</b>

\*Rates are considered unreliable when the rate is calculated with a numerator of 20 or less.

**Appendix III: Five-year NAS cases by County of Residence, 2016-2020**

County of Residence	Five-year Total, 2016-2020	Five-year Rate/1,000
Aitkin	7	12.1*
Anoka	108	5.2
Becker	21	12.2
Beltrami	140	44.6
Benton	13	4.9*
Big Stone	1	4.1*
Blue Earth	16	4.5*
Brown	5	3.8*
Carlton	41	22.7
Carver	12	2.1*
Cass	93	65.9
Chippewa	4	5.5*
Chisago	10	3.8*
Clay	1	7.1*
Clearwater	9	16.6*
Cook	1	5.1*
Cottonwood	2	3.3*
Crow Wing	21	6.4
Dakota	104	4.1
Dodge	3	2.5*
Douglas	6	2.9*
Faribault	2	2.8*
Fillmore	2	2.0*

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County of Residence	Five-year Total, 2016-2020	Five-year Rate/1,000
Freeborn	6	3.9*
Goodhue	7	2.8*
Grant	1	3.2*
Hennepin	419	5.3
Houston	0	0
Hubbard	5	5.1*
Isanti	10	4.5*
Itasca	27	12.6
Jackson	0	0
Kanabec	4	5.0*
Kandiyohi	3	1.1*
Kittson	0	0
Koochiching	10	21.2*
Lac Qui Parle	1	3.9*
Lake	3	5.9*
Lake of the Woods	0	0
Le Sueur	2	1.3*
Lincoln	0	0
Lyon	0	0
McLeod	5	7.3*
Mahnomen	27	97.5
Marshall	3	3.2*
Martin	4	2.2*
Meeker	4	3.0*

NEONATAL ABSTINENCE SYNDROME (NAS) DATA BRIEF

County of Residence	Five-year Total, 2016-2020	Five-year Rate/1,000
Mille Lacs	45	29.9
Morrison	12	6.6*
Mower	5	1.9*
Murray	0	0
Nicollet	3	1.7*
Nobles	1	0.7*
Norman	0	0
Olmsted	19	1.9*
Otter Tail	4	1.4*
Pennington	3	4.6*
Pine	26	21.3
Pipestone	0	0
Polk	5	6.8*
Pope	0	0
Ramsey	194	5.3
Red Lake	2	12.2*
Redwood	5	5.4*
Renville	5	5.6*
Rice	9	2.5*
Rock	0	0
Roseau	0	0
St. Louis	140	14.9
Scott	38	4.4
Sherburne	19	3.2*

NEONATAL ABSTINENCE SYNDROME (NAS) DATA BRIEF

County of Residence	Five-year Total, 2016-2020	Five-year Rate/1,000
Sibley	4	4.9*
Stearns	38	3.8
Steele	11	5.5*
Stevens	0	0
Swift	2	3.6*
Todd	2	1.3*
Traverse	1	9.6*
Wabasha	1	0.9*
Wadena	2	2.1*
Waseca	4	4.1*
Washington	63	4.7
Watonwan	0	0
Wilkin	2	13.1*
Winona	11	6.7*
Wright	22	2.5
Yellow Medicine	2	4.4*
7-county Metro	933	4.9
Greater MN	937	7.1
<b>Total</b>	<b>1870</b>	<b>5.8</b>

\*Rates are considered unreliable when the rate is calculated with a numerator or 20 or less.