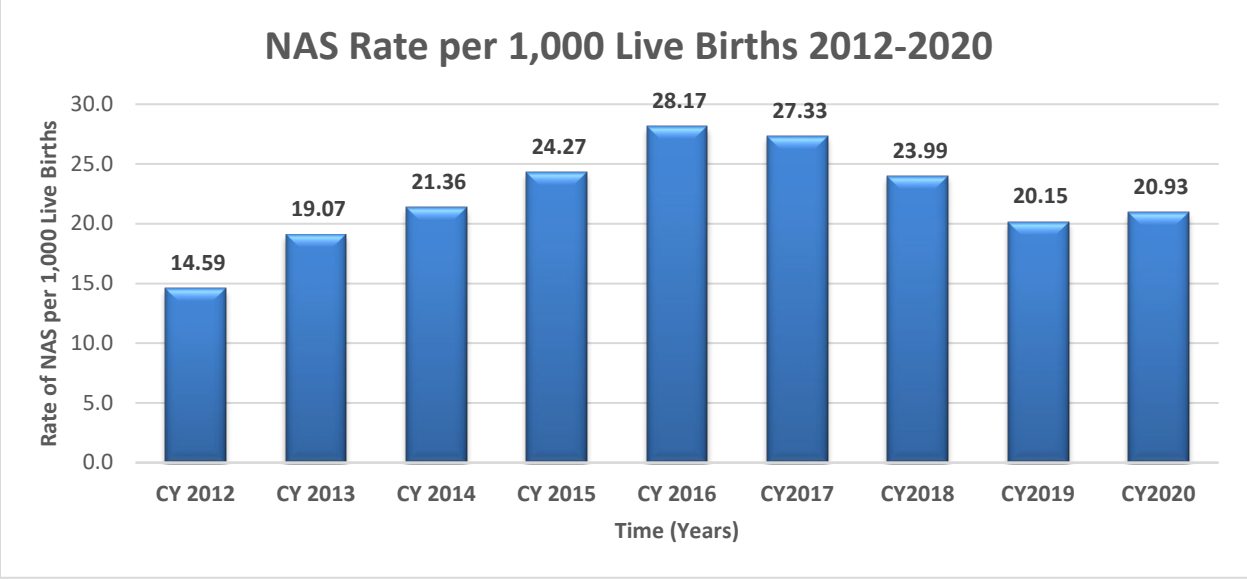
Neonatal Abstinence Syndrome (NAS) among TennCare Enrollees: 2020 data

Neonatal Abstinence Syndrome is a withdrawal syndrome experienced by newborn infants shortly after birth when they were exposed to certain substances, most often opioids, causing dependence in utero. The infant is exposed in the womb before birth when a mother uses substances such as prescriptions medications or illicit drugs during pregnancy. After birth, the newborn infant exhibits signs and symptoms of withdrawal once the infant is no longer exposed to or receives these substances. Infants with NAS stay in the hospital longer than other babies to treat these symptoms.

This report documents the occurrence of neonatal abstinence syndrome among TennCare enrollees in 2020. Cases of neonatal abstinence syndrome (NAS) were identified based on the presence of ICD10 diagnosis codes P96.1[1] and P96.2[1] transmitted to TennCare from medical providers billing for services provided to infants during the first year of life. This study included infants born between January 1 and December 31, 2020; where other years are provided for comparison purposes, those cohorts were born during the specified calendar year. TennCare eligibility status was determined using TennCare's Interchange system. Cases were identified from infants that were eligible at time of birth or enrolled in TennCare during their first year of life. Live births, used as the denominator, were determined based on a linkage of vital statistics records and TennCare eligibility records.

Figure 1: Incidence of Neonatal Abstinence Syndrome among TennCare Enrollees



As Figure 1 illustrates, there was an increase in the incidence rates of NAS per 1,000 live births among TennCare recipients from CY2011 to CY2016. However, the rate of NAS births has decreased for several successive years. The number of TennCare NAS births changed significantly from CY2016 to CY2020; there was almost a 3.5% decrease in NAS cases from CY2019 to CY2020.

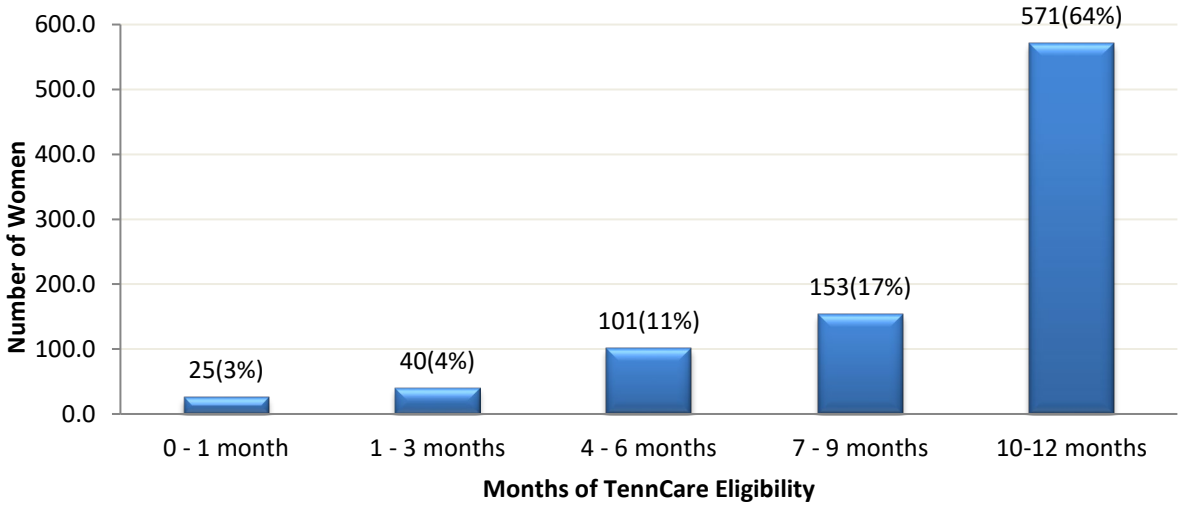
[1] Definition: Drug withdrawal syndrome in a newborn, excluding fetal alcohol syndrome.

Table 1: NAS Mother's TennCare Status at Time of Delivery

Calendar Year	TennCare Newborns Treated for NAS During Year	Mothers on TennCare at Time of TennCare NAS Birth	Percent of TennCare NAS Infants Born to TennCare Mothers	Mothers NOT on TennCare at Time of TennCare NAS Birth	Percent of TennCare NAS Infants NOT Born to TennCare Mothers
2008	264	229	87%	35	13%
2009	444	335	75%	109	25%
2010	512	424	83%	88	17%
2011	528	483	91%	45	9%
2012	736	613	83%	123	17%
2013	943	823	87%	120	13%
2014	1,101	1,017	92%	84	8%
2015	1,197	1,098	92%	99	8%
2016	1,357	1,261	93%	96	7%
2017	1,363	1,254	92%	109	8%
2018	1,181	1,093	93%	88	7%
2019	992	922	93%	70	7%
2020	957	890	93%	67	7%

Table 1 presents information regarding the TennCare status of mothers of TennCare NAS infants at the time of birth. In 2020, 93% of TennCare NAS infants were born to mothers who were eligible in TennCare at the time of delivery, while the remaining 7% of NAS infants were born to mothers who were not TennCare-eligible at the time of delivery. This ratio has remained steady since 2014.

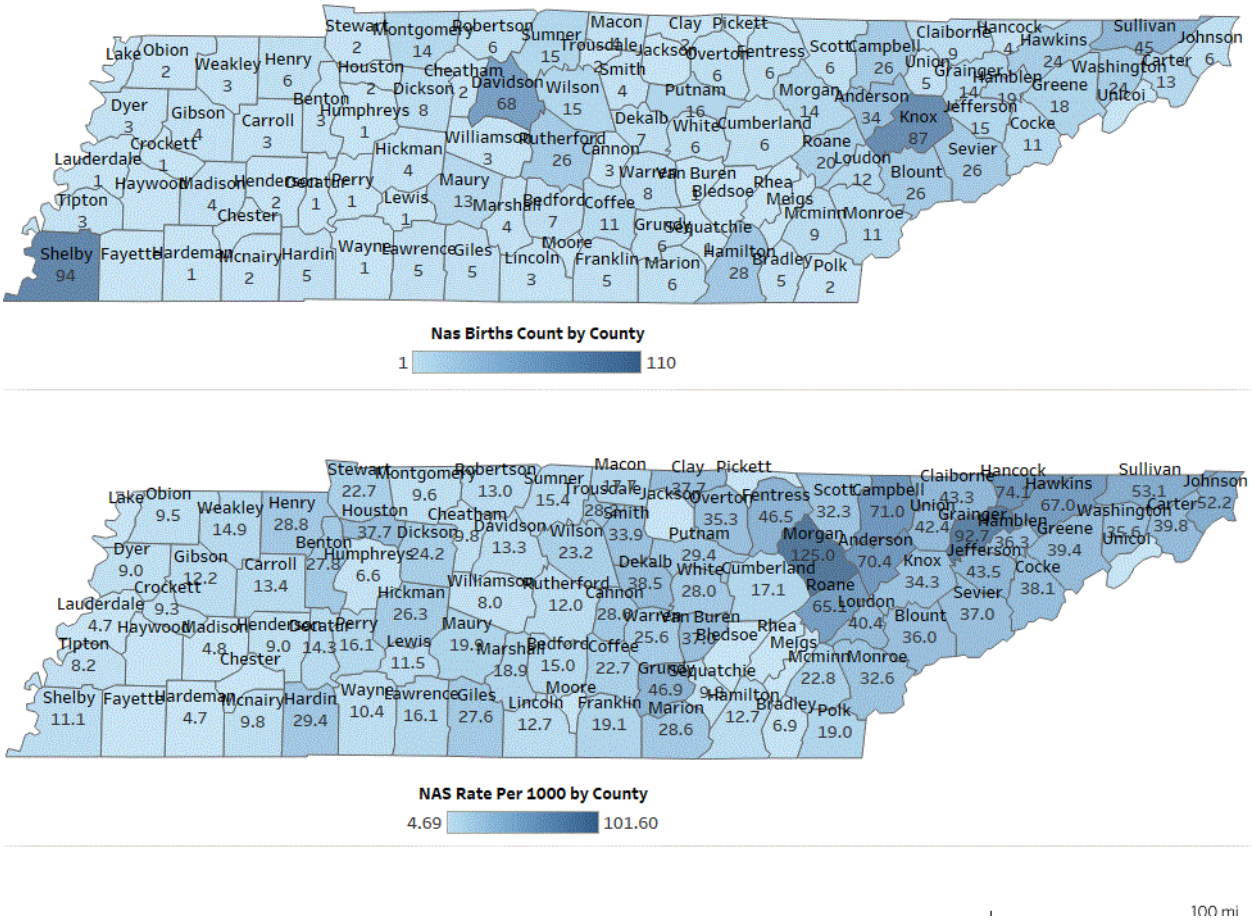
Figure 2: Eligibility Span for TennCare NAS Mothers through Pregnancy Period



For each woman with a TennCare child diagnosed with NAS in CY2020, the length of eligibility coverage for the mother prior to the child's birth was determined (Figure 2). There was a total of 25 mothers who

only had TennCare coverage within a month prior to the child's birth. Approximately 81% of women with NAS children had TennCare eligibility coverage for 7 months or more prior to the child's delivery.

Map 1: Incidence of NAS among TennCare Recipients by County



In order to visualize the relative incidence of NAS by county, counts (top map) and rates (bottom map) were plotted on a map of the state of Tennessee (Map 1). For the purpose of calculating county level rates, the county of residence of the infant was based on the address of the mother at the time of delivery. Total number of Medicaid live births was used as the denominator. The degree of regional variation is significant, as the second map illustrates counties in east Tennessee tend to have a higher NAS rate per 1,000 births . In 2020, Morgan County had the highest incidence of NAS births with 125 NAS births per 1,000 live births. The county with the highest total number of NAS births was Shelby County with 94 NAS infants in CY2020. NAS births follow a similar geographic pattern as emergency department visits for prescription drug related overdoses, in which rates are considerably higher in east and middle Tennessee.

Figure 3: Demographic Characteristics of NAS Mothers

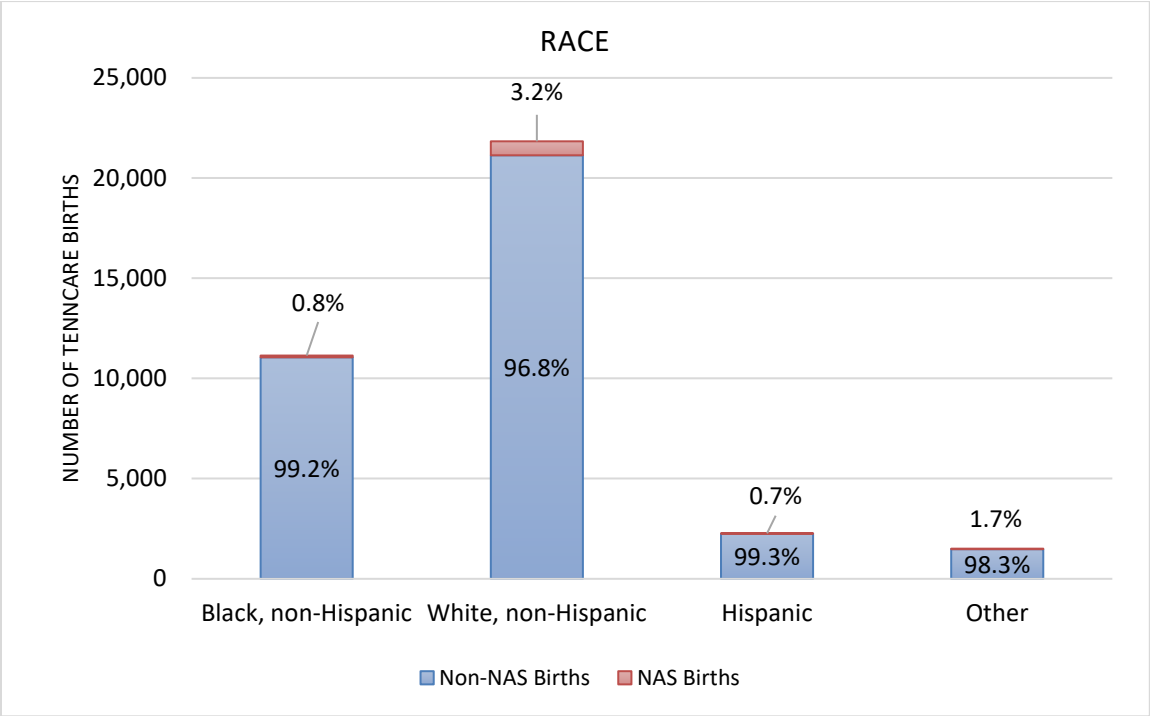


Figure 3A

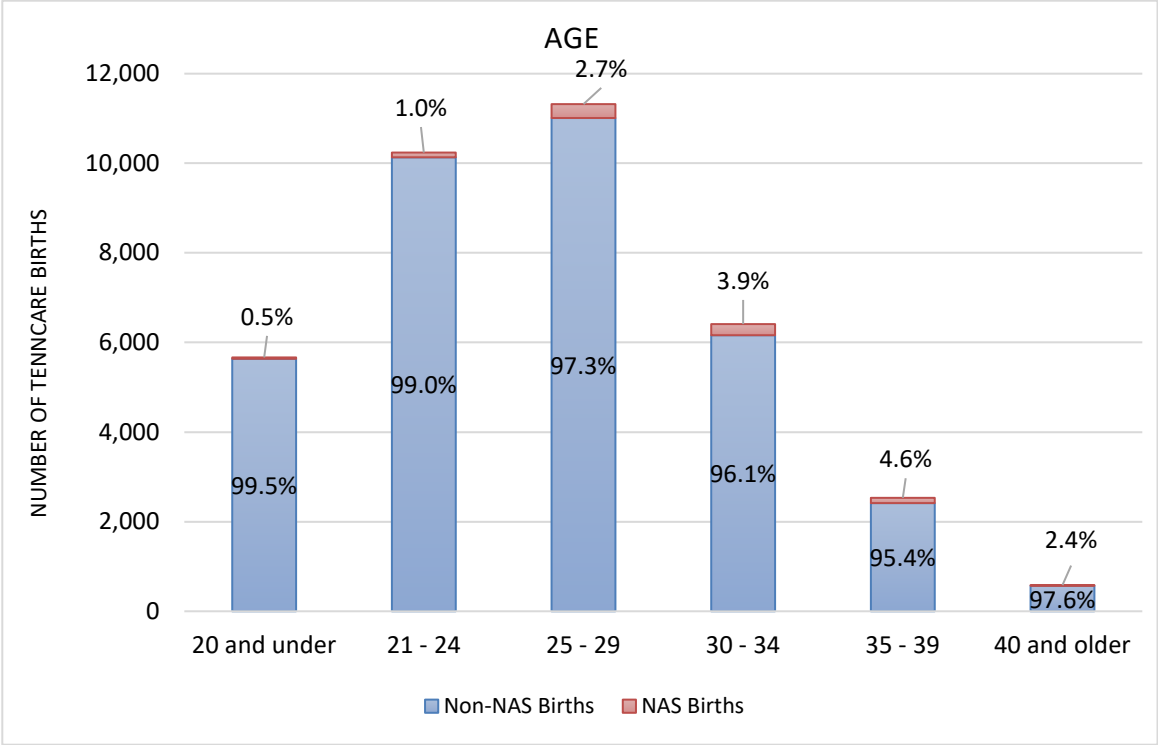


Figure 3B

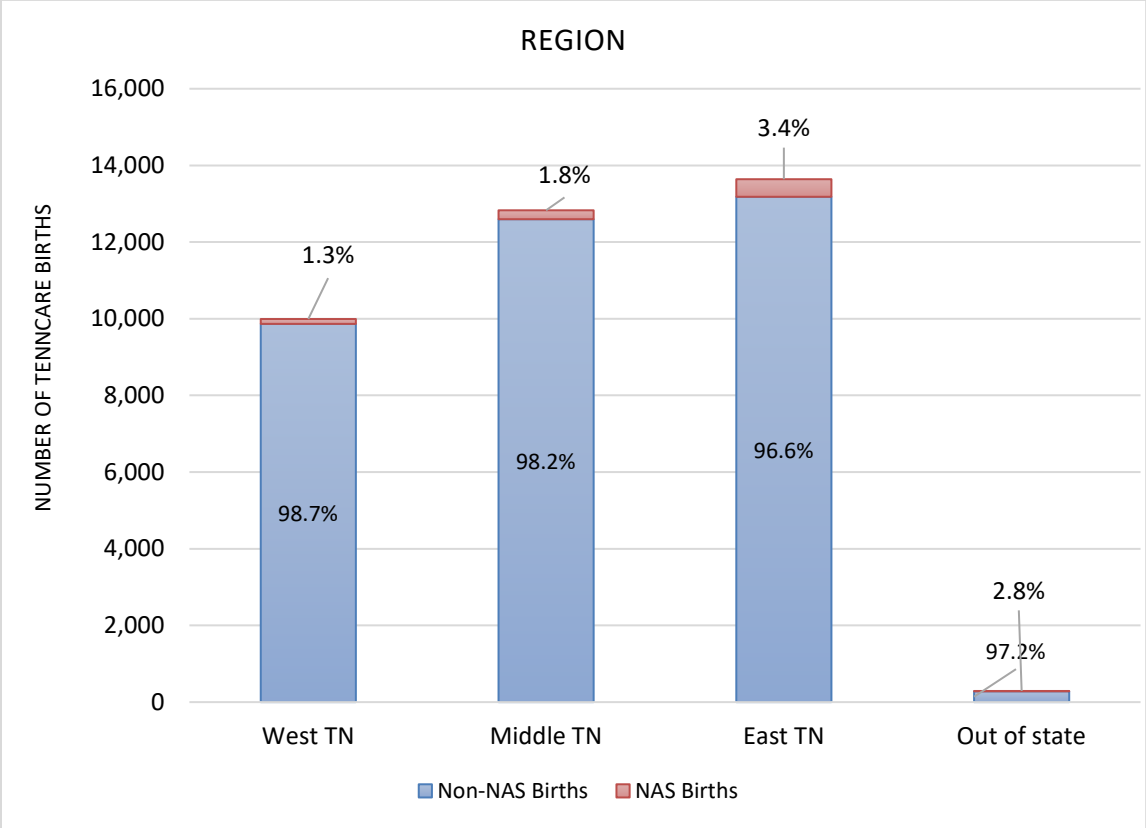


Figure 3C

Figures 3A, 3B, and 3C display basic demographic characteristics of NAS mothers who had TennCare eligibility coverage in CY2020. White Non-Hispanic mothers have the highest NAS rate (3.2%) among all the races (see Figure 3A). As displayed in Figure 3B, while women in the 25–29-year-old age category have delivered more NAS babies than any other age group, women in the 35–39-year-old age category have the highest rate of NAS deliveries. Generally, the risk of a baby being delivered with neonatal abstinence syndrome increases with the age of the mother. Figure 3C shows the delivery rate of NAS mothers in East Tennessee is 3.4% which is higher than Middle (1.8%) and West Tennessee (1.3%).

Table 2: Percentage of Infants in DCS Custody within One Year of Birth

Metric	All Infants	NAS Infants
Total Number of Infants	49,126	968
Number of Infants in DCS Custody	558	227
Percent of Infants in DCS Custody	1.1%	23.5%

Using TennCare eligibility records, it was determined that 227 of the 968 infants diagnosed with NAS in CY2020 (23.5%) were placed in Department of Children's Services (DCS) custody within one year of their birth. Among all TennCare infants born in CY2020, 1.1% were placed in DCS within one year of birth (Table

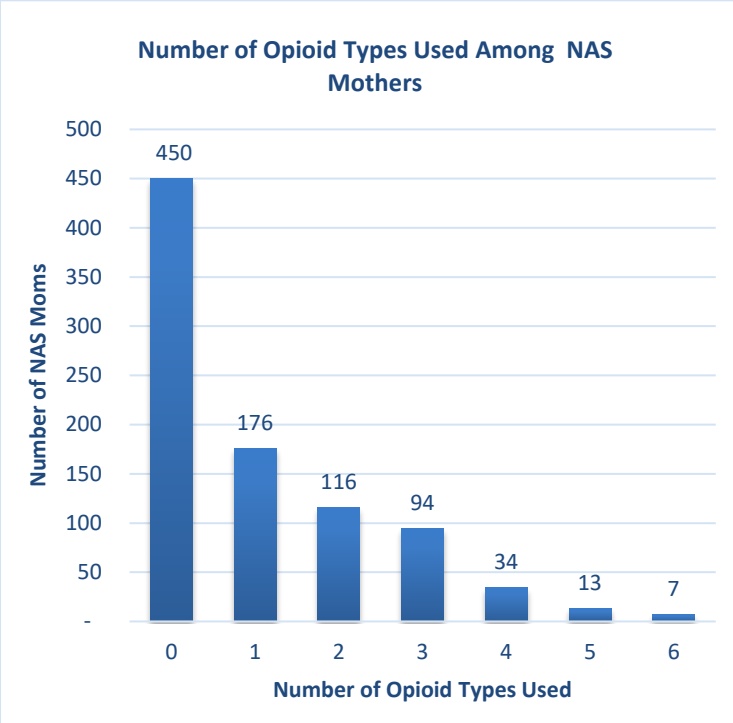
2). Infants born with NAS are about 20.6 times more likely to be in DCS custody during their first year of life as compared to other TennCare infants.

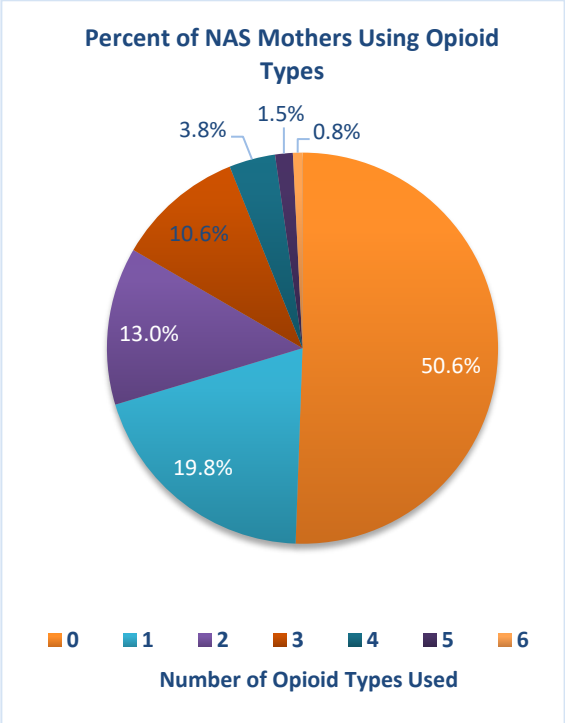
Table 3: Impact of NAS on Infant Health Care Expenditures[2]

Metric	All TennCare paid live births	All TennCare normal birth weight births	All TennCare live low birth weight births	NAS Infants
Number of Births	45,316	40,453	4,863	966
Total Cost for Infants in First Year of Life	$472,285,748	$238,620,437	$233,665,311	$51,992,304
Average Cost per Child	$10,422	$5,899	$48,050	$53,822
Average length of Stay	4.8	3.0	20.0	31.2

To determine the financial impact of NAS relative to all births, TennCare' s Interchange System was used to quantify expenditures for live born infants in the first year of life (Table 3). In CY2020, the average cost of care for a NAS infant in the first year of life is more than 9.1 times higher than the average cost of care for normal birth weight infants and more than 1.1 times higher than the average cost of care for low-birth-weight infants.

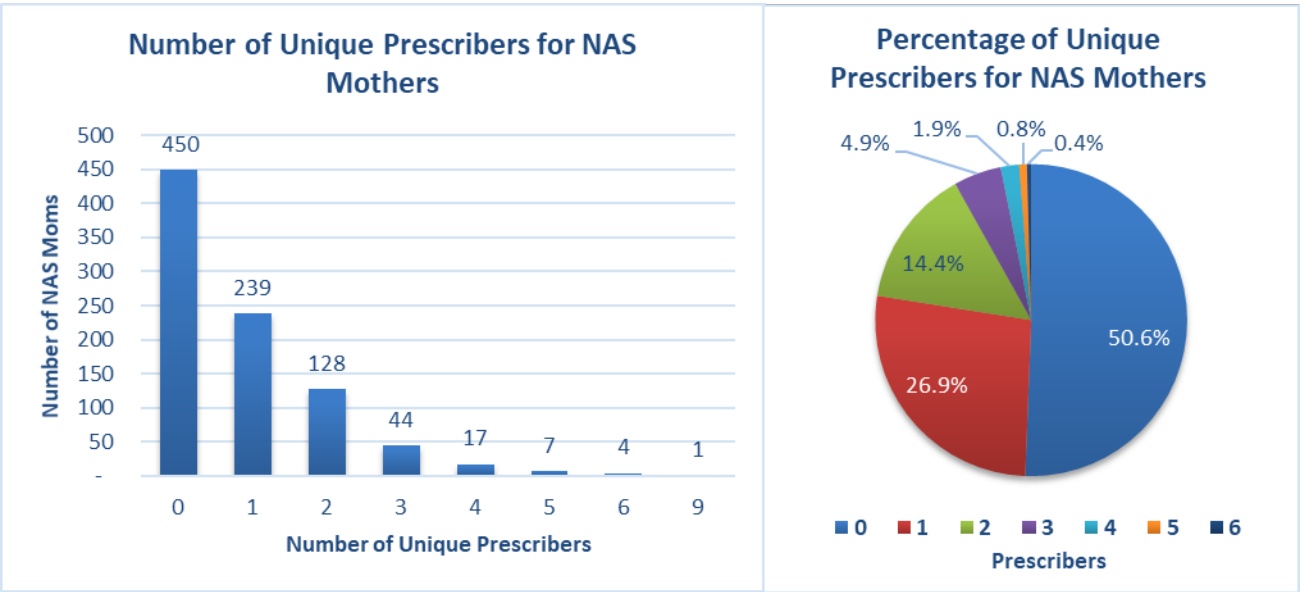
Figure 4: Number and Percentage of Unique Opioid Types for NAS Mothers





[2] Includes all expenditures paid through the first year of life. Totals are subject to change based on updated data.

Figure 5: Number and Percentage of Unique Prescribers for NAS Mothers



All opioid claims up to one year prior to birth for any woman with a NAS infant were evaluated. Medication Assisted Treatment medications, which are an evidence-based treatment and best-practice of care for members with opioid use disorder, are also considered opioids and were included in this analysis. Figures 4 and 5[3] illustrate the numbers of NAS mothers were using different TennCare-paid opioid prescriptions as well as the number of unique opioid types during the pregnancy period. Overall, a total of 4,925 TennCare-paid prescriptions for opioids were issued to 440 women with NAS infants. The overall percentage of mothers who did not have any opioid prescriptions paid for by TennCare was 50.6% (450/890) in CY2020. This value was similar to the number observed in CY2019 of 49.1% (469/922). Among NAS mothers with at least one opioid prescription paid by TennCare, each mother had on average 11.19 opioid prescriptions and from the remaining 49.4% women who received one opioid prescription, 66% of NAS mothers were received one or two types of opioids in the year of pregnancy period.

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[3] Any pharmacy claim with a National Drug Code correlation to the following Therapeutic Class Codes (HIC3) was considered an opioid: H3A, H3H, H3J, H3M, H3N, H3R, H3T, H3U, H3W or H3X.

[4] Any pharmacy claim with a National Drug Code correlation to the following Therapeutic Class Codes (HIC3) was considered an opioid: H3A, H3H, H3J, H3M, H3N, H3R, H3T, H3U, H3W or H3X.

an opioid prescription paid for by TennCare, over 43% were receiving medication assisted treatment for opioid or substance use disorder. Individuals who receive medication assisted treatment and recover services are more likely to have a full-term birth and less likely to have a low-birth weight baby. It is important to note that in 2020, TennCare did not cover methadone clinic services. Therefore, if women were receiving methadone maintenance therapy, claims for those services would not be included in this count. Additionally, this does not account for services provided in an institutional setting, such as an inpatient hospital, or other forms of addiction treatment where a separate pharmacy claim does not exist. Overall, these results show continued improvement in reducing opioid utilization and improving access to Medication Assisted Treatment and recover services for opioid use disorder. Both of these interventions have been integral to reducing the overall number of NAS births for TennCare members.

Table 4: Narcotic Analgesic and Contraceptive Use Among All TennCare Women

Demographics (Years)	TennCare Women	Women Prescribed Opioid (>30 days supplied)	Opioid Users Rate per 1,000	Women Prescribed Monthly Contraceptives and Opioid	% of Women on Opioid and Monthly Contraceptives	Women Prescribed Opioid without Monthly Contraceptives	% of Women on Opioid without Monthly Contraceptives
15 - 20	101,304	132	1	46	35%	86	65%
21 - 24	46,790	498	11	133	27%	365	73%
25 - 29	68,426	1,914	28	432	23%	1,482	77%
30 - 34	67,073	2,962	44	498	17%	2,464	83%
35 - 39	56,891	3,537	62	406	11%	3,131	89%
40 - 44	42,478	3,567	84	264	7%	3,303	93%
Total	**382,962**	**12,610**	**33**	**1,779**	**14%**	**10,831**	**86%**

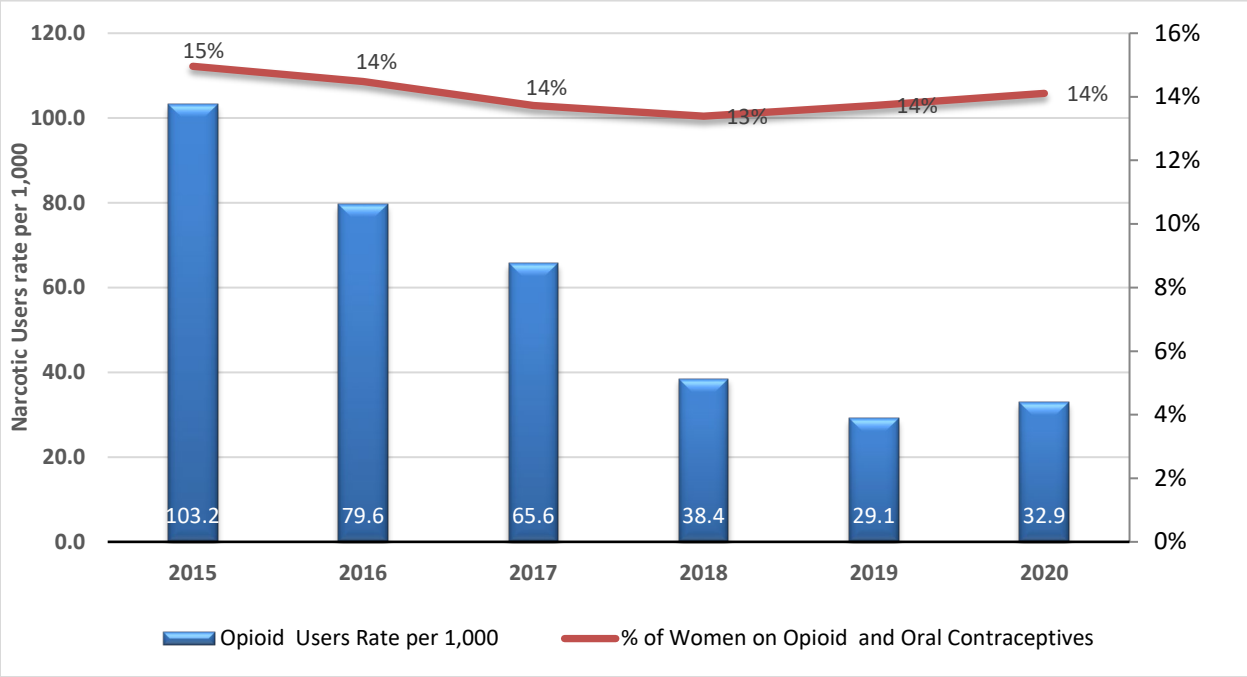
Note: This analysis underestimates use of voluntary long-acting reversible contraceptives (vLARC). Additionally, this metric does not account for individuals with permanent forms of contraception such as tubal ligation or hysterectomy.

The rate of women using prescribed opioids and contraceptive medications was determined in CY2020 (Table 4). The analysis was limited only to women of child-bearing age (15–44). The prescription histories of TennCare women of child-bearing age were evaluated for the presence of opioids and contraceptive products[5]. Pharmacy claims were used in this analysis and thus the claims more readily capture prescribed contraceptive options (e.g. oral, ICDs, injectable, transdermal, hormonal ring). Due to limitations in pharmacy claims, this analysis does not capture all women who may have used a voluntary long-acting reversible contraceptive (vLARC) and those who have permanent sterilization. Thus, this table is an underrepresentation of the full contraceptive options available to and being utilized by TennCare mothers. Women were excluded from the analysis if they had opioid prescriptions totaling less than 30 days in CY2020.

[5] Any pharmacy claims with an NDC correlating to any HIC3 codes of G8A, G8B, G8C, G8F, G9B, X1C, G9A was considered a contraceptive.

In 2020, the overall rate of prescription opioid utilization among women aged 15-44 was 33 opioid users per 1,000 eligible women, a 13% increase compared to 2019 (see Figure 6 below). As Table 4 indicates, approximately 14% of women of child-bearing age in 2020 who were prescribed opioids for more than 30 days a year were also prescribed a form of contraceptive. Future analysis will identify opportunities to incorporate these additional forms of contraception (e.g., vLARCs, implants, or other sterilization procedures) to better analyze contraceptive usage amongst TennCare prescription opioid users.

Figure 6: Opioid and Contraceptives Trends for TennCare Women



Based on the 5-year data regarding the utilization of opioid and contraceptives among TennCare women aged 15 to 44 years old, the rate of opioid users per 1,000 women continuously decreased from 2016-2019 and slightly increased in 2020. Similar to the Table 4, this does not capture all individuals with contraception, particularly vLARC and permanent sterilization. Figure 6 shows 74% decrease in the rate of opioid use among women aged 15-44 from 2015 to 2019 (103.2 versus 29.1 per 1,000 women) while slightly decrease from 2019 to 2020 (29.1 versus 32.9 per 1,000 women). The concurrent prescription of contraceptives with an opioid prescription are the same from 2019 to 2020. As discussed, this decrease may suggest that alternative forms of birth control are being used and will be an area for potential future analyses in subsequent NAS reports.