Cherokee Health Systems' Integrated Care Project: Management of Opiate Addicted Pregnant Women to Decrease Incidence of Neonatal Abstinence Syndrome

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INTRODUCTION

Neonatal Abstinence Syndrome (NAS) due to maternal opiate use has grown exponentially over the past several years, particularly in Eastern Tennessee. As of the date of this report, 366 new cases of NAS were reported in the state compared to 338 reported at the same time point in 2014 (TN Department of Health, 2015.) Of pregnant women who are addicted to opioids, 65 to 73% are estimated to also have diagnosable mental health problems. Evidence shows that the integration of mental health treatment with addiction treatment improves outcomes. Many prenatal programs, however, fail to address the concurrent mental disorders that either contribute to the development of addiction or co-occur with it.

For this reason, Cherokee Health Systems (CHS) began an integrated women's clinic specializing in substance use disorders in March of 2012. Women are seen at the CHS Center City clinic five days a week. Pregnant women identified with substance abuse are seen for follow-up in the high risk OB-GYN specialty clinic on Wednesdays and Fridays. At the initial intake visit, women have a 1) history and physical exam by an OB-GYN specialist, 2) assessment of gestational age, 3) substance abuse history and assessment, 4) behavioral health assessment by a clinical psychologist, 5) consultation with a psychiatrist for medication management as clinically indicated, 6) consultation with a community health coordinator/case manager for insurance applications, transportation, and other social support, and 7) blood and urine testing for routine prenatal tests and STD and drug testing. Patients are advised that throughout their pregnancy they will undergo intermittent point of care drug testing to assist in their treatment planning. Collaboration of providers at the initial meeting results in the diagnosis of concurrent mental disorders, current substance abuse status, assessment of pregnancy status, and the tailoring of a treatment plan to meet the individual needs of the patients. In cases where buprenorphine is clinically indicated and

appropriate to assist in the pregnant mother's addiction treatment, it is provided by a collaborating substance abuse specialist on a referral basis, with attempts to taper to abstinence by the third trimester of pregnancy. Over the course of the prenatal period, these pregnancies are jointly managed by CHS and maternal-fetal medicine in cooperation with University of Tennessee (UT) High Risk Pregnancy Center.

At delivery, neonatologists at either UT Hospital or East Tennessee Children's Hospital evaluate infants for evidence of NAS, and they are treated accordingly. Patients are scheduled to return to the women's clinic the week after delivery for continued management including treatment of depression, anxiety, or other mental disorders, and entry (when appropriate) into the intensive outpatient program (IOP) or another substance abuse treatment program. A specialist working collaboratively with the Knox County Department of Health and OB-GYN specialists provides contraceptive counseling.

CHS has evaluated this integrated mental health/medical model of addiction treatment to assess its effectiveness in limiting NAS and providing a platform for increasing rates of sobriety subsequent to pregnancy. Specifically, this evaluation addressed three questions:

1. What are the characteristics of pregnant women who abuse opioids?
2. What are the differences in maternal characteristics between women who are adherent to the treatment protocol and those who are not?
3. What are the differences in infant NAS-related outcomes between women who are adherent to the treatment protocol and those who are not?

Data included information on 37 women who were identified as using opiates during pregnancy and who received care in the CHS integrated care women's clinic between March 2012 and October 2014. Two licensed clinical psychologists employed by Cherokee Health Systems extracted research variables

from CHS' electronic health records. After extracting the data and removing personal identifying information, information was securely stored on the CHS network and transmitted electronically to the data manager at the University of Tennessee. Results of the analyses pertaining to the above questions are reviewed below.

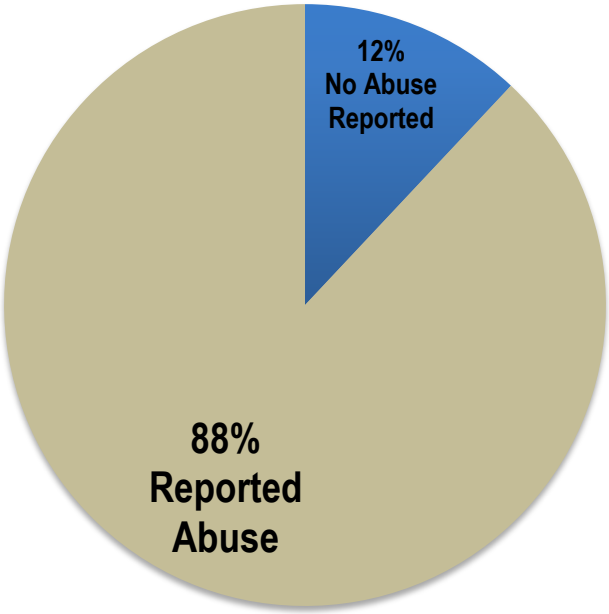
RESULTS

Question 1: What are the characteristics of pregnant women who abuse opioids?

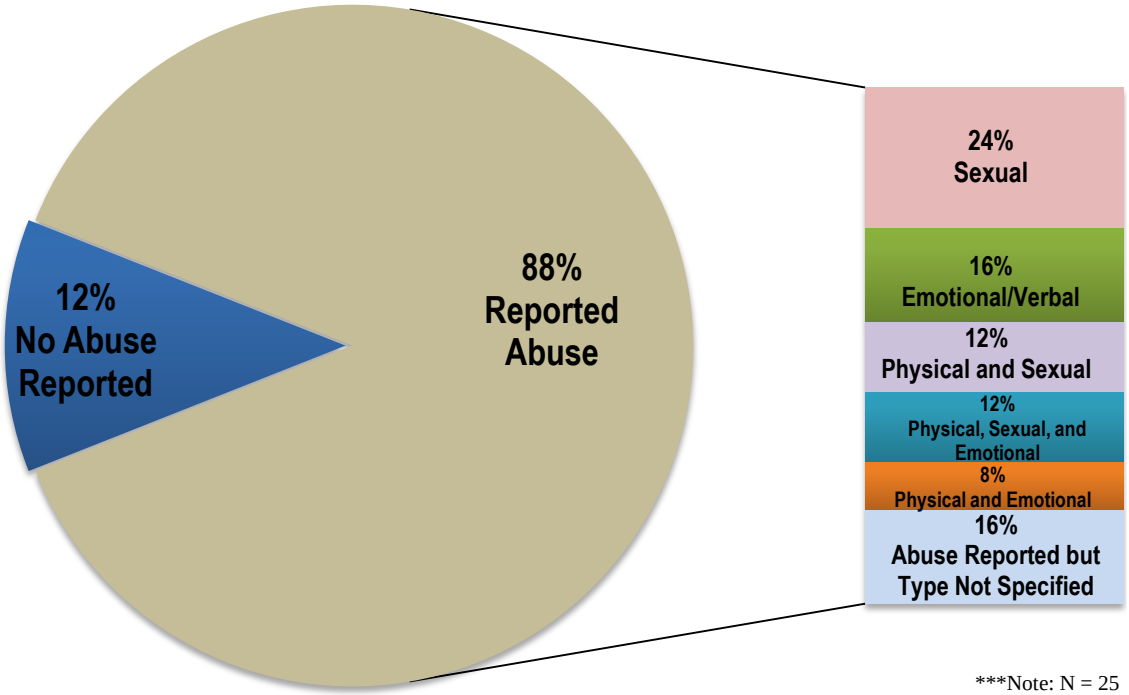
Characteristic	**Median or Percentage**
Total number of patients = 37	
Age	Median = 26.4 years (range = 20-39 years)
Ethnicity	94.6% White (n = 35)
Language	100% English (n = 37)
County of Residence	62% Knox County (n = 23)
Marital Status	81.8% unmarried/single (n = 30)
Number of Living Children	Median = 2 (range = 0-5)
Education	21.6% Less than HS (n = 8) 40.5% HS grad or GED (n = 15) 16.2% Some college (n = 6) 8.1% Associates degree or higher (n = 3) 13.5% Missing info (n = 5)
Employment Status	70.3% unemployed (n =26)
Insurance Status (including Medicaid)	87.5% insured at 1st CHS visit (n = 32)

In sum, patients were young, predominantly White, single, and relatively educated residents of Knox County. In addition, 88% of patients reported a history of abuse, and 91.7% reported co-morbid psychiatric diagnoses (see charts below). The most common types of opiates (including opiate agonists and substitutes) reported were buprenorphine, methadone, and Percocet.

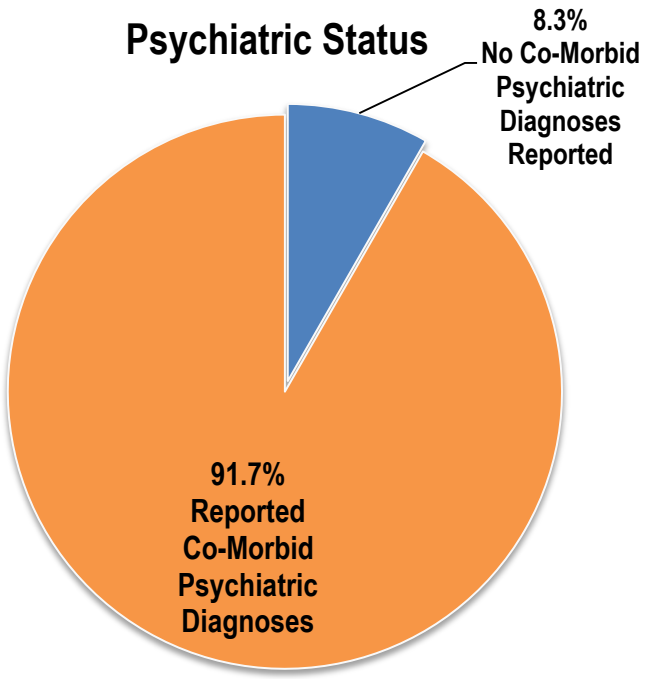
Abuse History



Abuse History by Type

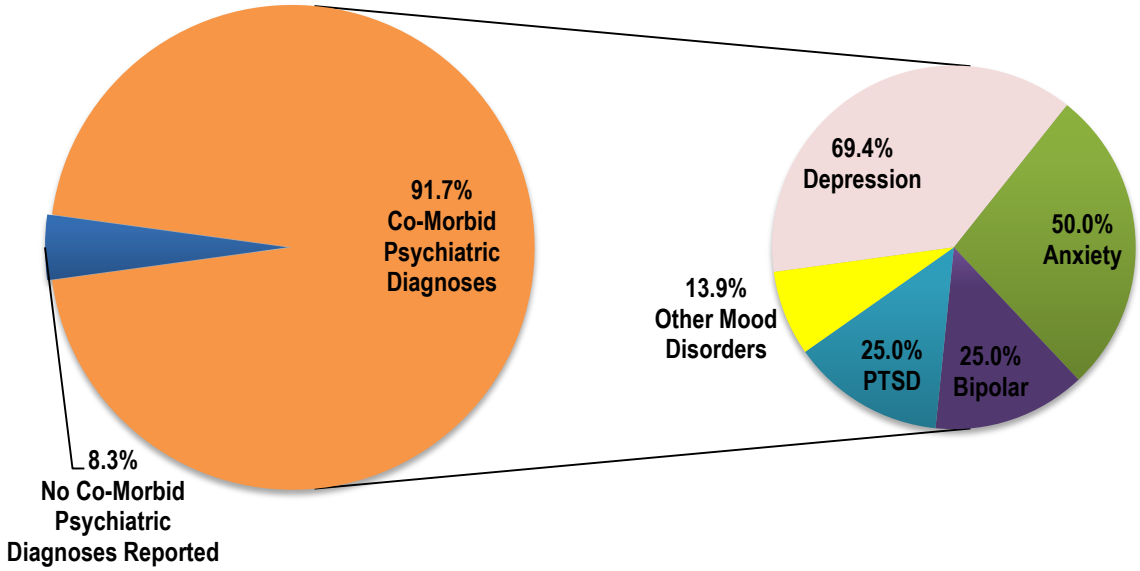


***Note: N = 25



*** N = 36

Psychiatric Status by Diagnosis

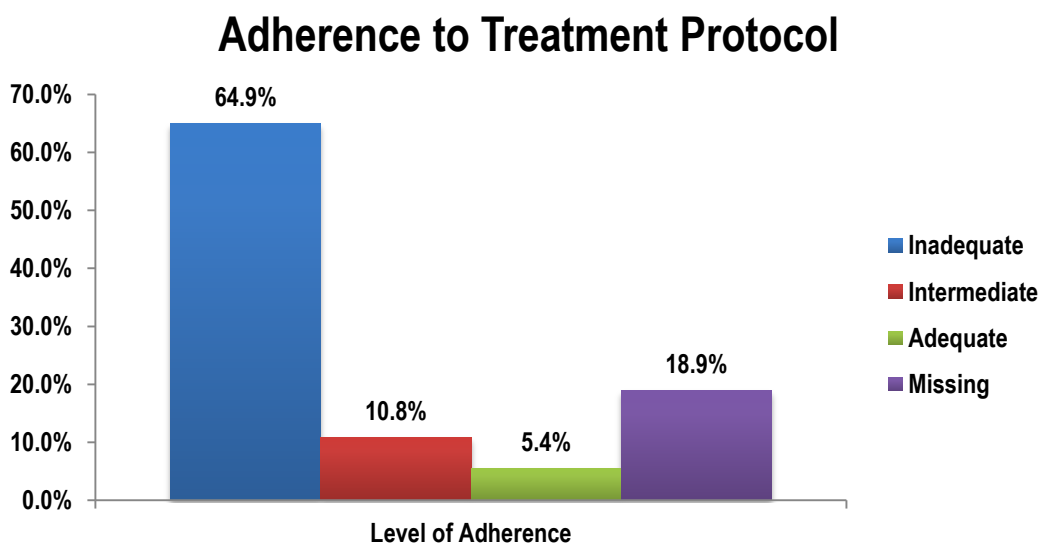


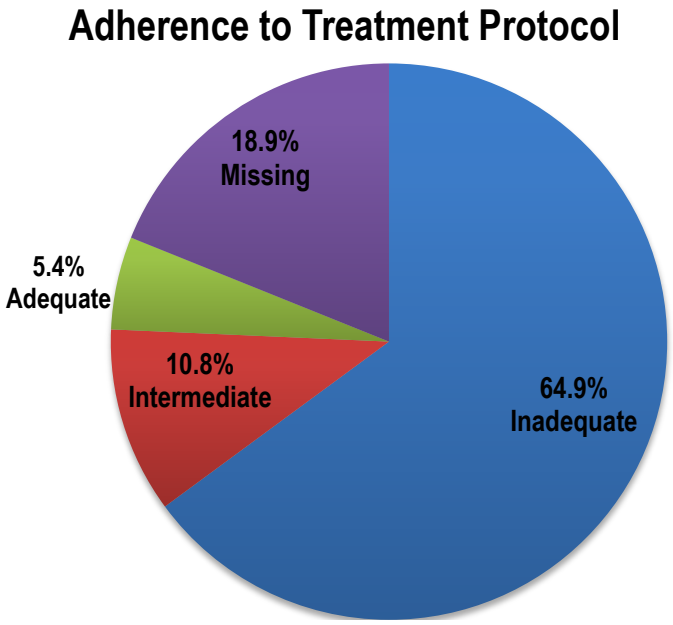
***Note: Total exceeds 100% due to co-morbid diagnoses (median = 2; max = 4)
Missing = 2.7%

Question 2: What are the differences in maternal characteristics between women who are adherent to the treatment protocol and those who are not?

Adherence to the CHS integrated care women's clinic treatment protocol was calculated based on number and timing of prenatal visits as well as the timing of the first CHS postpartum visit. The standards of the American College of Obstetrics and Gynecology (ACOG) recommend: 1) first prenatal visit during the first 8-10 weeks of pregnancy 2) one visit every four weeks to week 28 (ideal is 7 visits) 3) one visit every two weeks after week 28 (ideal is 3 visits), and 4) first postpartum visit within 56 days of delivery.

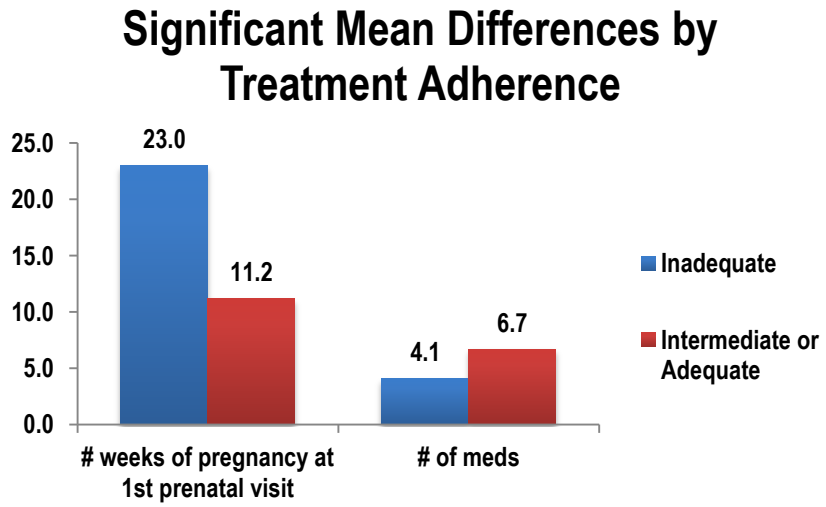
Using the ACOG guidelines, the number of total possible visits multiplied by 100 resulted in the percentage of fulfilled prenatal and postpartum visits. The Kotelchuck Index cuts (El-Monhandes et al., 2003; Department of Health and Human Services, 2013; Koroukian & Rimm, 2002; Magriples et al., 2008) were used to rank prenatal and postpartum care into three categories: inadequate (i.e., patient kept <50% of recommended number of appointments), intermediate (i.e., patient kept 50-79% of recommended number of appointments) and adequate (i.e., patient kept 80-100% of recommended number of appointments). This calculation was possible for 30 of the 37 women included in this evaluation. This information cannot be reported for the remaining seven women because the date of delivery was not available or the infant did not survive.



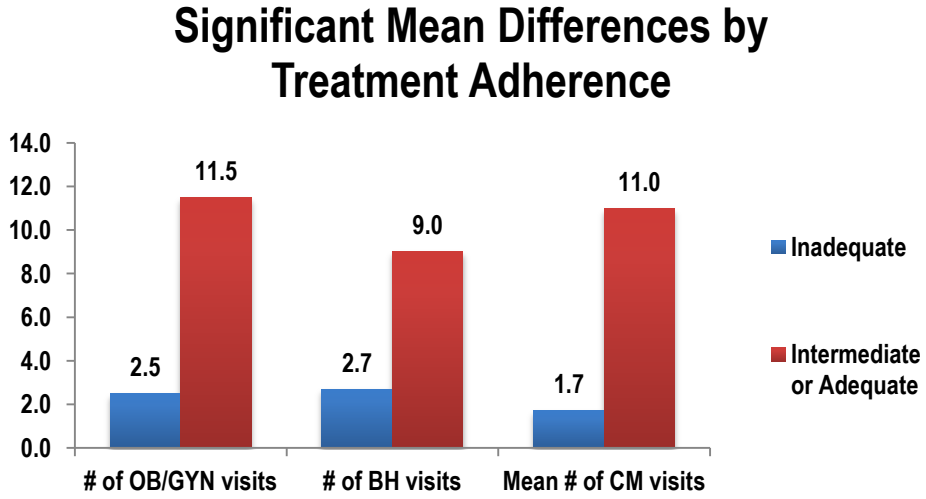


To compare the characteristics of the 30 women with available treatment adherence information, we divided the women into two groups: 1) inadequate and 2) intermediate or adequate. On average, the women with better treatment adherence (i.e., attended between 50 and 100% of ACOG recommended appointments) had more prenatal visits and entered prenatal care at an earlier gestational age compared to women with inadequate treatment adherence. They

also took more medications, including opiates, antibiotics, and psychotropics, than women with inadequate prenatal care (see chart below).



Women with better prenatal care adherence also had a significantly higher average number of behavioral health and case management visits compared to those with inadequate prenatal care (see chart below). No significant differences were found for any of the other characteristics reviewed for Question 1 of the study.



Question 3: What are the differences in infant NAS-related outcomes between women who are adherent to the treatment protocol and those who are not?

Infant outcomes, including NAS diagnosis, were available for 23 of the 37 women. NAS infant outcomes are available in the table below.

NAS Status	Percentage
No NAS	65.2% (n = 15)
NAS	34.8% (n = 8)
Baby not yet born or neonatal demise	5.4% (n = 2)
Missing info	32.4% (n = 12)

Although not at the statistically significant level, additional analyses indicated a trend that women with a greater likelihood of having an infant with NAS required higher levels of prenatal care. For example, they were more likely to be classified as having received intermediate or adequate care.

Of the 37 women included in this evaluation, 12 received either methadone or buprenorphine assisted treatment (MAT) at some point during their pregnancy, and seven of the 23 infants for whom outcome data was available were born to mothers enrolled in MAT. No differences were found in adherence to the prenatal treatment protocol based upon their MAT status, however. As stated in the above table, of the 23 infants for whom outcome data was available, 8 were diagnosed with NAS at delivery. There was no statistically significant difference in the number of infants diagnosed with NAS based upon whether or not they were prescribed methadone or buprenorphine (see table below). Further analyses, however, indicated a descriptive statistical trend toward positive MAT status being related to a higher risk of NAS. Namely, women who received MAT treatment at some point in their pregnancy were more likely to have babies with NAS. Approximately 57% of infants diagnosed with NAS were born to mothers who

were enrolled in MAT compared to 25% born to mothers who were not enrolled in MAT.

MAT Status	Number of Infants Diagnosed with NAS
Prescribed methadone or buprenorphine	n = 4
Not prescribed methadone or buprenorphine	n = 4

Birth Control

Of the 37 women included in this evaluation, 21 of them received postpartum birth control. See the table below for additional information regarding postpartum contraception.

Contraception Status	Percentage
Adopted postpartum contraception	56.8% (n = 21)
Discussed postpartum contraception but did not initiate contraception	16.2% (n = 6)
No contraception information available	27% (n = 10)
Time at Which Postpartum Contraception Initiated	
At the hospital	54% (n = 20)
At postpartum visit	2.7% (n = 1)
Type of Contraception Received	
Bilateral tubal ligation	16.2% (n = 6)
Depo Provera	27% (n = 10)
Oral contraceptives	13.5% (n = 5)

SUMMARY AND RECOMMENDATIONS

In sum, descriptive and evaluative analyses of the CHS Integrated Care Women's Clinic revealed the following findings:

- Patients were predominantly young, White, high-school educated, and single residents of Knox County, Tennessee. This finding is contrary to commonly

held beliefs that substance abusing pregnant women are uneducated members of minority groups. While this could reflect a selection bias towards women who access care, this seems unlikely given the demographics of CHS' overall patient population, which reflects far more diversity in race, level of education, age, and marital status.

- The majority of women included in this evaluation reported a history of physical, sexual, and emotional abuse history. Of the 88% of women who reported abuse, nearly a quarter of them (24%) reported a sexual abuse history.
- 91.7% reported co-morbid psychiatric diagnoses, and depression was the most common of these co-morbid diagnoses.
- Over half of the women (64.9%) were classified as having received inadequate prenatal and/or postpartum care.
- Women who were classified as receiving intermediate or adequate prenatal and/or postpartum care also received more services including behavioral health consultant, case management, and OB/GYN visits.
- 65.2% of the women in CHS' integrated care program for whom infant outcome data was available delivered NAS-free infants. This rate is nearly twice the documented rate of infants born with NAS for addicted women who receive usual or no care.
- The majority of women in this evaluation received postpartum contraception; however, there were six who initiated discussion of the topic but did not subsequently adopt a method. Women in this patient population were notably less likely to utilize long-acting reversible contraception (LARC) including IUDs or implants, which are widely considered much more effective than other methods. These findings are consistent with recent

research indicating that half of women in U.S. rely on methods of contraception that are of limited efficacy (White, Teal, & Potter, 2015) Although the women in the present study reported a median of two living children, research suggests that lack of access to LARC is associated with increased rates of unintended pregnancies during the first year following delivery.

- Although not statistically significant, there was a descriptive trend toward positive MAT status being related to positive NAS outcome, and this is consistent with the literature showing a relationship between MAT and NAS outcomes. In addition, this finding is consistent with TN Surveillance Data on NAS outcomes, which states that of the 366 new NAS cases to date, the source of maternal substances was supervised replacement therapy for 223 women or 60.9%.

Based upon these results, we offer the following take home points and recommendations to the TN Department of Health regarding critical components of optimal management of pregnant women abusing opioids.

- The women included in this evaluation were highly traumatized individuals with histories significant for multiple forms of abuse. Interventions and legislation designed to address the NAS epidemic must be mindful of the precipitants of substance abuse as well as the context in which substance use occurs for these pregnant women.
- In addition to the significant trauma history, women in this evaluation reported substantial rates of co-morbid psychiatric diagnoses. In fact, only three women reported that they did not have a co-morbid psychiatric diagnosis. These findings suggest that the NAS epidemic cannot be viewed

within a substance abuse vacuum; there are other factors that play a role in the perpetuation of this problem. There is a need for comprehensive interventions that effectively attend to these underlying social determinants of illness and co-morbid psychological issues and that do not parcel out substance abuse above and beyond a woman's traumatic or psychological history.

- Many of the women were categorized as receiving inadequate prenatal care due to the delay in their first prenatal appointment. Active outreach and creative access strategies to further encourage pregnant women engaged in prenatal opioid use are needed to increase treatment adherence. For example, Cherokee Health Systems posts encouraging public health announcements to promote initiation of prenatal care especially for women with substance abuse concerns. While it is clear that multiple factors may be contributing to delayed access to prenatal care, fear of legal or negative consequences due to substance misuse during pregnant was identified as a deterrent to early engagement in care.
- That women classified as receiving intermediate or adequate prenatal and/or postpartum care received greater amounts and types of services also speaks to the importance of the availability of comprehensive services to address the myriad needs of substance abusing pregnant women. Although no significant findings were obtained based upon the amount and types of services received, these findings raise the question of the potential impact of markedly increased access to comprehensive medical and behavioral health care on the rates of NAS.
- Given the common utilization of contraceptive methods of limited efficacy and subsequent increase likelihood of pregnancy, efforts to educate women about contraception options and make readily, inexpensively, and

conveniently available the most effective contraceptive methods would likely reduce the risk of unintended pregnancies within the first year following delivery and beyond.