

***At A Glance*—Preventing Neonatal Abstinence Syndrome: Facts, Factors, and Strategies**

The United States is experiencing a rise in opioid misuse, dependence, and overdose among its adult population.¹ Included in this rise is a five-fold increase in women giving birth to infants with Neonatal Abstinence Syndrome (NAS), a postnatal drug withdrawal syndrome that occurs primarily among opioid-exposed infants shortly after birth.² Newborns of mothers with an opioid use disorder have a 50% chance of developing NAS.³

Babies with NAS may display a constellation of symptoms, including central nervous system irritability (e.g., tremors, increased muscle tone, high-pitched crying, and seizures), gastrointestinal dysfunction (e.g., feeding difficulties), and temperature instability.⁴ Because of these health problems, newborns with NAS remain in the hospital for an average of 23 days, compared to the usual two days for healthy infants. These lengthier hospitalizations lead to substantial increases in hospital costs: \$93,400, on average, for newborns with NAS, compared to \$3,500 for healthy newborns.⁵ Less is known about the long-term health and developmental outcomes and associated economic costs of NAS into childhood, adolescence, and adulthood.

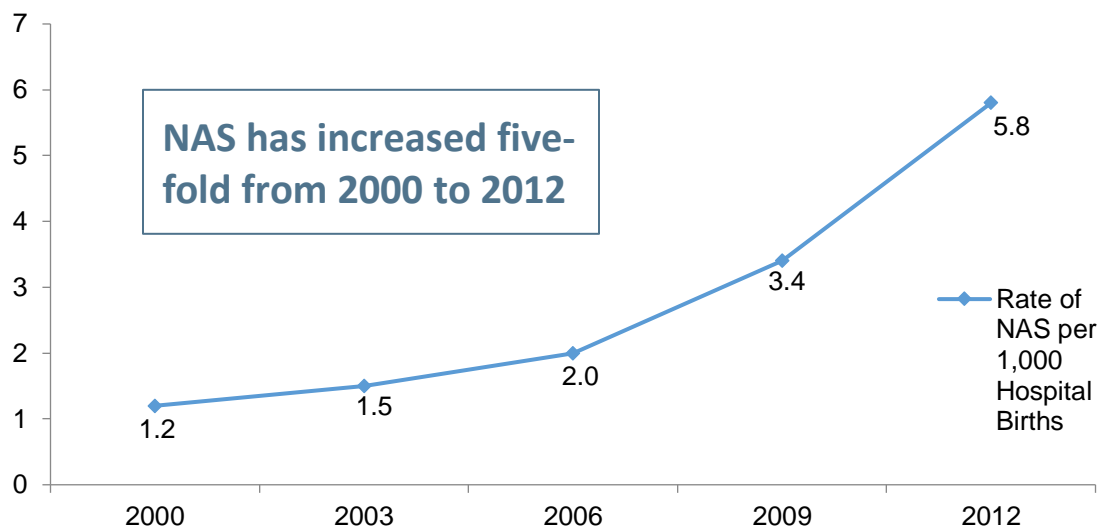
Given the rise of NAS, there is increased urgency to identify and intervene with women who use opioids and are: sexually active and not using birth control, thinking about becoming pregnant, or are pregnant. This document is designed to help SPF Rx and PDO grantees, and other SAMHSA substance misuse prevention grantees, better understand and prevent this growing health problem. Specifically, it provides an overview of:

- The prevalence of NAS and maternal opioid use;
- Risk and protective factors associated with maternal opioid misuse; and
- Strategies to prevent maternal opioid misuse and associated NAS.

PREVALENCE OF NAS AND MATERNAL OPIOID USE

Over the past 10 years, rates of NAS have increased dramatically. Graph 1 depicts this rise. In 2000, there were 1.2 cases of NAS per 1,000 hospital births. In 2012, this rate increased to 5.8 per 1,000 hospital births, with a noticeable rise from 2007 to 2012.^{6,7}

Graph 1: NAS Prevalence in the United States



Most NAS cases can be attributed to maternal use of prescription opioids or heroin.⁷ In fact, the increase in NAS rates mirrors the increase in opioid use (from either prescription opioids or heroin) among pregnant women and women of child-bearing age.^{†,2,8}

Not all opioid use is misuse. Many pregnant women receive and use opioids prescribed by their doctors. Between 2005 and 2011, an estimated 14.4% of pregnant women in the U.S. were prescribed an opioid during their pregnancy.⁹ Between 2008 and 2012, more than one quarter of privately insured women ages 18–44 and more than one third of women of the same ages enrolled in Medicaid filled a prescription for an opioid medication.^{‡,10}

On average, about 21,000 pregnant women ages 15–44 misused opioids in the past month, according to combined data from the 2007 to 2012 National Surveys of Drug Use and Health (NSDUH). When looking more closely at when during pregnancy women tended to misuse, the NSDUH survey revealed that pregnant women were statistically more likely to misuse opioids during their first trimester than their second or third trimester. Younger pregnant women aged 15–17 and 18–25 were more likely to misuse opioids in the past month than older pregnant women (aged 26–

[†] Women of child-bearing age are defined here as those who are between the ages of 15 and 44 years old.

[‡] This data does not differentiate between women who are misusing opioids and those who are using opioids as prescribed.

34). Pregnant women living below the federal poverty level were also more likely to misuse opioids compared to pregnant women living at or above the poverty level.⁸

Heroin use also contributes to the incidence and prevalence of NAS. In fact, women who initially use prescription opioids non-medically sometimes move onto using heroin since it is less expensive and more readily accessible. In 2012, 22.9% of pregnant women admitted for treatment in the United States reported heroin use, while 28.1% reported non-heroin opioid misuse. Similar proportions were found between non-pregnant female admissions (20.1% and 23.5% respectively).⁸

RISK AND PROTECTIVE FACTORS ASSOCIATED WITH OPIOID USE

Because NAS is a consequence of opioid use during pregnancy, reducing opioid use among women of child-bearing age, and pregnant women in particular, is critical to NAS prevention efforts. Understanding the risk and protective factors associated with opioid misuse among these populations can help practitioners assess, plan for, and select appropriate prevention strategies. Table 1 provides a short summary of the literature on risk and protective factors that are associated with misuse of prescription opioids among women of childbearing age and adolescent girls.¹¹

Table 1: Risk and Protective Factors Associated with Misuse of Prescription Opioids

Risk Factors	Protective Factors
All Women of Childbearing Age	
<ul style="list-style-type: none"> • Initiation of prescription drug misuse before age 13 • Past-year misuse of alcohol, marijuana, and illicit substances • Past 30-day drunkenness and past 30-day or current use of cigarettes • Having a previous history of alcohol or other drug misuse • Being unemployed (ages 18–34)[§] • Having poor health, illness, or injury[§] • Past-year diagnosis of anxiety or mood disorders (ages 18–25) • Having a lower household income (ages 18–25)[§] 	<ul style="list-style-type: none"> • Having greater perception of substance misuse risks • Having a four-year college degree[§] • Community norms that disapprove of the non-medical use of prescription drugs • Being married (ages 18–25) • Being employed (ages 35–49)

[§] These risk and protective factors are typically markers for other mediating factors. While the literature is not conclusive, prevention practitioners should keep in mind mediating factors that may exist.

Risk Factors	Protective Factors
Adolescent Girls	
<ul style="list-style-type: none"> • Past 30-day use of substances • Experiencing depression • School delinquency[‡] • Peer attitudes favorable toward substance misuse • Greater peer use of substances • Weak social bonds • Decreased religiosity[‡] • Parental attitudes favorable to substance use • Experiencing a large number of negative life events • Living in an urban environment[‡] • Moving three or more times in the past year[‡] • Societally-influenced perception of risks associated with substance use 	<ul style="list-style-type: none"> • Being in school[‡] • Commitment to doing well in school, and finishing high school • Attending a prevention class • Having a greater perception of risk associated with substance use • Parental disapproval of substance use • Strong parent-child bonds • Having a higher household income[‡]

In addition to those risk and protective factors associated with prescription opioid misuse, there are also risk and protective factors that are specific to heroin use. These risk factors include:

- Personality characteristics, such as cynicism or a high level of anger toward self and others[‡]
- Dependence on, or misuse of, opioid pain relievers; history of poly-drug use; or early onset of drugs or tobacco use
- Experiencing depression
- Having experienced a history of child abuse (sexual, physical or emotional)
- Dropping out of school, having a history of foster care placements, participating in multiple delinquent behaviors, or having ever been in jail or a detention center

[‡] These risk and protective factors are typically markers for other mediating factors. While the literature is not conclusive, prevention practitioners should keep in mind mediating factors that may exist.

While the research predominately focuses on risk for heroin use, one study identified having high IQ[‡] scores or high socioeconomic status[‡] as protective factors.¹²

STRATEGIES TO PREVENT NAS

The Centers for Disease Control and Prevention (CDC) has identified a handful of strategies shown to be effective in preventing or lowering the incidence of NAS.¹³ Examples of each strategy are provided below. In addition, we include strategies from our own comprehensive review and meta-analysis. The strategies are organized into two categories:

- Strategies designed to reduce opioid use among pregnant women and women of childbearing age; and
- Strategies to reduce harm among women using opioids.

Strategies to Reduce Opioid Use Among Pregnant Women and Women of Childbearing Age

- **Coordination of Comprehensive Services.** Approaches that coordinate medical care, psychiatric services, and social services strengthen the relationship between the patient and the healthcare system, and therefore may have a greater impact on opioid use than a fragmented system of care.^{14,15} Although no evaluation has been completed on the effectiveness of this method in preventing opioid misuse among pregnant women, several reviews have been conducted to support the integration of services for optimal patient care.^{16,17,18}
- **Systemwide Provider Education.** This strategy is aimed at providing education to prescribers on the dangers of prescription drug misuse. Provider education, such as the *CDC Guidelines for Prescribing Opioids for Chronic Pain* (<https://www.cdc.gov/mmwr/volumes/65/rr/rr6501e1.htm>) recommends that, prior to initiating opioid therapy, clinicians discuss with reproductive-aged women family planning and the potential effects of long-term opioid use on future pregnancies. Again, there is no empirical evidence to support the effectiveness of these guidelines in preventing opioid misuse among women who are pregnant or likely to become pregnant. However, evidence from other fields of study points to the effectiveness of provider guidelines in promoting clinician behavior change to reduce the incidence of neonatal abstinence syndrome.
- **Universal Screening.** Validated substance use screening tools such as the Screening Brief Intervention and Referral to Treatment (SBIRT) model and 4 P's Plus Screen for Substance Use in Pregnancy^{**},¹⁹ can be administered to all pregnant women during their typical

[‡] These risk and protective factors are typically markers for other mediating factors. While the literature is not conclusive, prevention practitioners should keep in mind mediating factors that may exist.

^{**} The 4Ps is an acronym for 4 categories of questions asked in the 4P's Plus Screen for Substance Use in Pregnancy. The 4Ps include: Parents (Did either of your parents have a problem with alcohol or drugs?); Partner (Does your partner have a problem with alcohol or drugs?); Past (Have you ever drunk beer, wine or liquor?); Pregnancy (In the month before you

encounters with healthcare services. Screen results then provide a basis for communication between the provider and patient about the effects of prenatal substance use and appropriate referrals for treatment. This universal approach—targeting all women of childbearing age—also helps to reduce the stigma associated with substance use screening by normalizing conversations with healthcare providers about substance use.^{14,15} This approach has not been evaluated specifically for its effectiveness in preventing opioid misuse among women of childbearing age; however, due to its efficacy in other populations and with other substances for opioid misuse, it remains a recommended strategy by key federal agencies.^{20, 21}

Strategies to Reduce Harm Among Women Using Opioids

- **Contraception for Drug-Dependent Women.** Unintended pregnancies constitute about half of the pregnancies in the U.S., and nearly 90% of pregnancies among women struggling with opioid misuse. Providing free contraception for drug-dependent women has been shown to reduce the risk of fetal opioid exposure and subsequently NAS.^{14,22,23,24}
- **Medication-Assisted Treatment (MAT).** MAT relies on the use of medications, in combination with behavioral therapies, to provide a whole-patient approach to treating substance use disorders. Individuals receiving MAT often demonstrate dramatic improvement in addiction-related behaviors and psychosocial functioning. MAT using methadone or buprenorphine is the standard of care for opioid-dependent pregnant women.^{14,15,25}

LEARN MORE ABOUT OTHER PREVENTION STRATEGIES

Most women of child-bearing age have the potential to become pregnant. Therefore, efforts should be taken to reduce opioid use and misuse among this population in general. More information on strategies to reduce the nonmedical use of prescription drugs is included in the CAPT tool [Preventing Prescription Drug Misuse: Programs and Strategies](#). More information on strategies to prevent heroin use is included in [Preventing Heroin Use: Facts, Factors, and Strategies](#).

knew you were pregnant, how many cigarettes did you smoke? In the month before you knew you were pregnant, how many beers/how much wine/how much liquor did you drink?).

CONCLUSION

Infants born with symptoms of NAS are on the rise, but prevention measures can help curb this trend. A thorough understanding of NAS can help prevention practitioners customize approaches that fit the needs of their communities, and that ultimately reduce the number of infants born with NAS. Careful consideration of the risk and protective factors associated with opioid misuse, and then selecting strategies that address these factors, can help prevention practitioners reduce opioid misuse by adolescent girls and women and subsequently reduce the number of infants born with NAS.

APPENDIX: SOURCES OF ADDITIONAL INFORMATION ON NAS

NAS Overviews

- *Neonatal Abstinence Syndrome*. A June 2015 fact sheet published by the National Association of State Alcohol and Drug Abuse Directors, Inc., available at <http://nasadad.wpengine.com/wp-content/uploads/2015/06/NAS-Fact-Sheet-Final.pdf>
- *Neonatal Abstinence Syndrome*. List of publications, webinars, videos and recent research studies from SAMHSA's National Center on Substance Abuse and Child Welfare, available at <https://ncsacw.samhsa.gov/resources/opioid-use-disorders-and-medication-assisted-treatment/neonatal-abstinence-syndrome.aspx>
- *A Collaborative Approach to the Treatment of Pregnant Women with Opioid Use Disorders: Practice and Policy Considerations for Child Welfare, Collaborating Medical, and Service Providers*. HHS Publication No. (SMA) 16-4978. Substance Abuse and Mental Health Services Administration, 2016, available at: https://ncsacw.samhsa.gov/files/Collaborative_Approach_508.pdf. Developed in collaboration with the Administration for Children and Families, this new SAMHSA publication provides an overview of opioid use among pregnant women, evidence-based treatment recommendations, and tools for developing a collaborative action plan.

NAS Incidence and Trends

While the incidence of babies born with NAS in the U.S. is not uniformly tracked, there are several sources that provide data on NAS and related indicators, including the following:

- *State Inpatient Database (SID)*. A database of inpatient discharge records from community hospitals by state. It includes national and state information on neonates born with primary and secondary diagnoses of NAS; pregnant mothers with opioid-related primary and secondary diagnoses, and women of childbearing age (15–44) with opioid-related primary and secondary diagnoses. Online analysis available at <http://hcupnet.ahrq.gov/>

- *Treatment Episode Data Sets (TEDS)*. Includes information on treatment admissions involving heroin, non-prescription methadone and other opiates/synthetics among women who are pregnant or of child-bearing age (15–44 years) at the time of admission. Online analysis available at <https://www.icpsr.umich.edu/icpsrweb/ICPSR/>
- *National Survey on Drug Use and Health (NSDUH)*. Includes information on heroin, methadone, and other opioid use by pregnancy status and trimester of pregnancy, and use by women of child-bearing age (15–44 years). Online analysis available at <https://www.icpsr.umich.edu/icpsrweb/index.jsp>
- *Incidence of Neonatal Abstinence Syndrome — 28 States, 1999–2013*, in the August 2016 issue of *Morbidity and Mortality Weekly Report (MMWR)*, available at <http://www.cdc.gov/mmwr/volumes/65/wr/mm6531a2.htm>

These resources provide information on NAS at the national and state levels, but are less useful as sources of community-level data. Only a few of these resources provide county-level data, and the indicator estimates available from them are often unstable or suppressed given the low case counts. To address these data gaps, communities may find it helpful to connect with the following agencies or departments in their respective states, jurisdictions, or tribes, as many routinely collect relevant information:

- Substance abuse and mental/behavioral health agencies
- Department of health/public health
- Hospitals and emergency rooms
- Prescription drug monitoring programs
- Police departments and drug courts

Opioid Use and Disorders

- *Nonmedical Prescription Opioid Use and Use Disorders*. An overview of national trend data from 2003–2013 on non-medical use of prescription opioids and prescription opioid use disorders published in the October 2015 edition of the *Journal of the American Medical Association*. Available at <http://jama.jamanetwork.com/article.aspx?articleID=2456166>
- *Prescription Drug Use and Misuse in the United States: Results from the 2015 National Survey on Drug Use and Health*. A report published by SAMHSA that provides a summary of findings from the 2015 National Survey on Drug Use and Health (NSDUH) and a comparison with previous NSDUH data analysis of prescription drug misuse in the United States. Available at <http://www.samhsa.gov/data/sites/default/files/NSDUH-FFR2-2015/NSDUH-FFR2-2015.htm>

Heroin Use

- *Trends in Heroin Use in the United States: 2002 to 2013*. A report from the Center for Behavioral Health Statistics and Quality (CBHSQ), published by SAMHSA with a summary of NSDUH findings on heroin use in the United States. Includes indicators on past-year heroin use, heroin dependence, treatment for heroin use, perceptions of risk from heroin use, and perceptions of heroin availability. Available at http://www.samhsa.gov/data/sites/default/files/report_1943/ShortReport-1943.html
- *Today's Heroin Epidemic*. This web page, hosted by the Centers for Disease Control and Prevention, provides a brief overview on the heroin epidemic, including infographics on incidence, prevalence and action steps for states. Available at <http://www.cdc.gov/vitalsigns/heroin/>

Risk and Protective Factors for Opioid Misuse

- *Preventing Prescription Drug Misuse: Understanding Who Is at Risk*. This resource summarizes information from cross-sectional and longitudinal studies on factors that have been shown to either increase risk of or protect against the non-medical use of prescription drugs, including opioids. Available at <https://preventionsolutions.edc.org/services/resources/preventing-prescription-drug-misuse-understanding-who-risk>
- *Preventing Heroin Use: Facts, Factors, and Strategies*. This at-a-glance provides additional information on risk and protective factors for both heroin use and the nonmedical use of prescription opioids. Available at <https://preventionsolutions.edc.org/services/resources/preventing-heroin-use-facts-figures-and-strategies-issues-brief>

Strategies to Prevent NAS

- *Preventing Prescription Drug Misuse: Programs and Strategies*. This resource from SAMHSA's CAPT summarized strategies to support the prevention of prescription drug misuse, including opioids. Though this resource is not specifically focused on women, the information included can be useful when considering prevention strategies for this specific population. Available at <https://preventionsolutions.edc.org/services/resources/preventing-prescription-drug-misuse-programs-and-strategies>

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