1. **Neonatal Abstinence Syndrome**

Neonatal abstinence syndrome (NAS) has been defined as a group of problems that occur in a newborn following intrauterine exposure to substances which can cause physical dependence. NAS is associated with chronic use at or near the time of delivery. If more than two weeks have passed since the last exposure then withdrawal in the newborn is unlikely. Addiction is a behavior related problem and is different from physical dependence. Babies are born physically dependent on substances (particularly opiates) - they are NOT addicted.

The incidence of NAS in exposed infants has been reported to be between 55 and 94%. NAS is on the rise as evidenced by the reported three-fold increase in the incidence during the years from 2000 to 2009. One study found that although infants born to substance-abusing mothers accounted for 2.9% of hospital births, they accounted for 18.2% of neonatal intensive care bed days demonstrating the economic burden this problem can create.

Onset of withdrawal can range from 3-14 days and varies depending on several factors including half-life of substance and time of last exposure. The AAP Policy Statement on NAS recommends that infants exposed to short-acting opiates (e.g., hydrocodone, oxycodone) be monitored for 3-5 days for signs and symptoms of NAS and those exposed to longer acting opiates (e.g. methadone) be monitored for 7 days prior to discharge from the hospital.

There are multiple substances of abuse and many users will abuse more than one substance leading to multiple exposures in the infant. Marijuana may be the most frequently abused substance, but it is not associated with withdrawal. Cocaine is also not associated with withdrawal, however when used in conjunction with opiates can make withdrawal symptoms worse. Serotonin reuptake inhibitors (SSRIs) are not associated with NAS. They are associated with “neonatal adaptation syndrome” that occurs in the first couple days of life. Symptoms mimic NAS, but this condition is self-limiting and usually resolves in 48-72 hours of life. Rather than withdrawal, this syndrome is thought to be associated with direct effect of the drug and symptom resolution correlates with drug excretion. Opiates and benzodiazepines are both associated with withdrawal in the neonate. Opiate withdrawal is the most common and most studied withdrawal syndrome. For purposes of this article, NAS will refer to opiate withdrawal.

It is important to note that not all NAS is a result of illicit drug use. Women who are taking prescribed opiates for chronic pain conditions may have infants with NAS.

Figure 1 lists both brand and generic names of commonly used opiates.

**Figure 1**
Methadone is associated with more frequent and more severe withdrawal in the neonate than illicit drug use. It is preferred in pregnant women however because it stabilizes mom's lifestyle, reduces risk taking behavior, and decreases the incidence of preterm birth and intrauterine growth restriction. Buprenorphine (Subutex) use for opiate addiction management in pregnancy has been associated with less severe NAS and decreased overall treatment dose in the infant than methadone but may not be an acceptable alternative for all substance abusers.6

Different tools can be used for screening for substance abuse. Urine is only of use when collected in the early post-delivery hours. Meconium is a good source for screening and gives a broader picture of exposure throughout the later stages of pregnancy. Hair and umbilical cord can also be used for screening. Pay close attention to what you are screening for at your institution as these tests have different panels associated with them. Be aware that opiate screens look only for natural opiates. Exposure to methadone, a synthetic opiate, can lead to a negative test. Methadone and other synthetic opiates must be tested for specifically on your panel to capture them.

Symptoms of NAS can be grouped into respiratory, gastrointestinal, and central nervous system (CNS). Respiratory symptoms include tachypnea, sneezing, nasal flaring, and nasal stuffiness. Gastrointestinal symptoms include excessive sucking, poor feeding, regurgitation, and watery diarrhea. CNS symptoms include excessive high-pitched cry, sleep disturbance, tremors, increased tone, and convulsions. Subclinical symptoms may persist for weeks or months following treatment and/or hospital discharge.

Several tools are available for scoring NAS symptoms. The modified Finnegan tool is the most commonly used. Other commonly used tools include the Lipsitz and Neonatal Withdrawal Inventory. These tools assign a symptom based score that is used to determine treatment initiation, titration, and weaning.

Each tool has its own trigger point for treatment. With the modified Finnegan tool, scores of eight are considered an indication for treatment. Institutions take different approaches to interpreting this. Some use the average of three scores, some look for two of three scores to be greater than eight while others need two consecutive scores greater than or equal to eight in order to treat. Dose is titrated and weaned based on these scores.
All babies at risk for NAS should be treated with non-pharmacologic measures including: swaddling in a light blanket; dim lights; minimum stimulation; kangaroo care; cover hands to protect skin; frequent diaper changes; offering a pacifier; and breastfeeding (if mom is a candidate).

Opiate therapy is recommended for treatment of NAS. Either morphine or methadone may be used. Doses of various ranges have been used and include both weight based approaches as well as symptom based dosing. Phenobarbital is no longer recommended for first line use, but may have a place as an adjunct in some babies. Clonidine has demonstrated efficacy in reducing the duration of pharmacologic treatment of NAS. Buprenorphine is under investigation as alternative treatment for NAS. The AAP statement does not recommend a specific treatment regimen but does recommend that each unit that cares for these infants have a standardized treatment approach. Figure 2 is taken from the Novant Health Forsyth Medical Center Best Practice Guideline on the treatment of Neonatal Abstinence Syndrome.

Figure 2

<table>
<thead>
<tr>
<th>In utero substance exposure</th>
<th>Starting Dose</th>
<th>Titration</th>
</tr>
</thead>
</table>
| All non-methadone opiates   | Morphine 0.05mg/kg/dose PO q3h | Increase by 0.05mg/kg for two consecutive scores ≥ 8
Maximum dose = 1mg/kg/dose |
| Methadone < 80mg/day        | Morphine 0.1mg/kg/dose PO q3h | Increase by 0.1mg/kg for two consecutive scores ≥ 8
Maximum dose = 1mg/kg/dose |
| Methadone ≥ 80mg/day        | Morphine 0.2mg/kg/dose PO q3h | Increase by 0.1mg/kg for two consecutive scores ≥ 8
Maximum morphine dose = 1mg/kg/dose |

Mothers who are compliant with their sobriety program should be encouraged to breastfeed their infant. Aside from the multitude of benefits that breastfeeding offers the mother/infant dyad, there are specific advantages for babies suffering from NAS. Babies with NAS who have received mother's breast milk have decreased need for pharmacological treatment and a shorter treatment duration. Breastfeeding is soothing and comforting to infants and probably accounts for some of this advantage, but some babies included in these studies also received expressed breast milk. Breast milk may contain small amounts of methadone which can help to ameliorate symptoms. Breast milk has the additional advantage of being more easily digested and likely helps with the feeding intolerance that NAS babies experience. Mothers should be counseled that abrupt discontinuation of breastfeeding can lead to withdrawal that may require hospital admission and pharmacologic treatment. The Academy of Breastfeeding Medicine has published guidelines that can help direct which mothers are candidates to breastfeed their babies.

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References


2. New Northwest AHEC online course, “Neonatal Abstinence Syndrome: What to Do?”

Northwest AHEC is pleased to announce a new online course, “Neonatal Abstinence Syndrome: What to Do?” This opportunity is a captured lecture from the annual High Risk Newborn: Sharing the Care workshop which is held each May at Lake Hickory Country Club in Hickory, North Carolina. The faculty members for this particular course are Amy Holmes, PharmD, Neonatal Clinical Pharmacy Specialist and Martha Harrelson, BSN, RNC, NICU Clinical Unit Leader. Both work at Novant Health Forsyth Medical Center in Winston-Salem.

This online program is available for 1.0 contact hour CE credit from Northwest AHEC and is available at no charge. You may enroll at the Northwest AHEC website, northwestahec.org to access this continuing education opportunity.
3. **Save the Date: 32nd Annual Gravidas at Risk Perinatal Conference**

The 32nd Annual Gravidas at Risk Perinatal Conference will be held on November 18 & 19, 2014 at the Crowne Plaza Hotel in Hickory, North Carolina. Topics on the agenda this year include Common Licit and Illicit Drugs: Perinatal Neurobehavioral Outcomes, Safe Haven: From Tragedy to Triumph After Perinatal Loss, Clinical Case Studies and Preedampsia: Updated Diagnosis and Treatment. Other scheduled presentations are: Pregnancy and Opioid Exposure, Group B Strep: Implications for Care, and An Update on March of Dimes North Carolina’s Preconception Health Campaign. Brochures will be available early August. We hope to see you there!

4. **LABOR SUPPORT SKILLS**

Recently, I had the pleasure of sharing the evidence for healthy birth practices at a workshop in Boone, North Carolina through Northwest AHEC. The group gathered to reengage with the “Art of Labor Support.” Over the course of the day, we reviewed how maternity care has sometimes been victimized by unproven, unstudied technologies that have unintended negative outcomes like low exclusive breastfeeding rates and rising cesarean birth rates.

After an anthropological look at past and current childbirth practices, we all were challenged with how best practices have not been hardwired into our systems. As we explored six healthy birth practices based on recent Cochrane data base reviews, our focus turned to the gifts we can provide our families through our presence at the bedside, touch in appropriate ways and advocacy for our mothers’ decisions.

In our busy afternoon we worked to increase our skill sets with hands on strategies that support physiological birth practices. We shared ideas on how to normalize the routines in our systems so that we allow more flexibility for 90% of births that may not be truly high risk. Time was spent adapting our evidence based strategies for the mother who chooses epidural anesthesia. We applied knowledge that skin to skin at birth reinvigorates the natural hormones for breastfeeding. Because the infant left on the chest for several hours after an epidural can often find the breast much like a non-medicated baby, we agreed that we should adapt our workflow to decrease interruptions for the baby as much as possible.

As we concluded our day, we had learned from one another and stopped to ponder the beauty and majesty of normal birth. Renewed by the importance of helping mothers celebrate their own choices and the power of the maternity nurse to positively impact the family, each of us will work in our settings to make birth uniquely special as directed by an empowered mother.

If you want to learn how to educate families with life skills that promote normal birth, please consider attending a Lamaze Evidence Based Nursing: Labor Support Skills, 7 hour CE workshop.

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5. Human Trafficking: What are the Health Implications?

The reported number of people enslaved around the world today is twice the number as compared to the 350 years of African slave trade. It is hard to pinpoint the exact number of women involved in human trafficking due to the secretive nature of this crime. Human trafficking generates billions of dollars each year, with about 800,000 people being trafficked internationally – and millions more being affected within their own countries. It is estimated that approximately 17,000 people are trafficked within and across the borders of the USA each year. The total number of hotline calls and tips received in the state of North Carolina alone was 1,875 from December 2007 to November 2013.

Human trafficking is defined by the US Victims of Trafficking and Violence Protection Act as “the recruitment, harboring, transportation, provision, or obtaining of a person for labor or services, through the use of force, fraud, or coercion.” It is estimated that 80% of trafficking victims are women and children, and they are used for forced labor and sexual exploitation.

Physical health implications associated with this type of slavery include: injuries, communicable diseases, and occupational injuries. Dermatologic, ENT, cardiovascular, respiratory, gastrointestinal, urogenital, neurologic and musculoskeletal systems may all be affected. Exposure to HIV, STIs and tuberculosis are commonly associated with human trafficking. Mental health implications include possible posttraumatic stress disorder and depression among trafficking victims.

Nurses and other health care providers can be alert to many signs of potential trafficking – unexplained physical injuries such as fractures or bruises, forced abortions, signs of torture, and psychological effects.Victims rarely identify themselves as being in human trafficking, so careful screening and assessment are crucial if a provider is to intervene. If trafficking of a minor is suspected, reporting to child protective services or law enforcement is needed. Referrals may be made to appropriate authorities for older victims with consent. Human trafficking may have potentially devastating health consequences, and it is the responsibility of care providers to be alert to this epidemic.

Richards, TA. Health Implications of Human Trafficking (2014). *Nursing for Women’s Health* 18(2), 155-162.

- Contributed by Mona Brown Ketner RN, MSN

6. CMV and Pregnancy

Cytomegalovirus is a DNA herpes virus that can cause many symptoms. CMV is the most common congenital viral infection, with a prevalence of < 1% of live births being infected. Most congenital infections are asymptomatic, but there is a risk for severe neurologic morbidity in the infant. Neonatal clinical associations may include: SGA, microcephaly, hepatitis, visual loss, and cognitive impairment.

CMV infections during pregnancy are classified as either primary (initial acquisition of virus occurs during pregnancy), or nonprimary (maternal CMV antibody present before conception).

CMV prevalence is higher in the following female populations: women in lower socioeconomic conditions, women residing in developing countries, non-Hispanic black and Mexican-American women,
those over 25 - 30 years of age, women of higher parity, and those with children younger than three years of age - especially if the children are in daycare. Maternal transmission to the fetus or newborn is most common following a primary maternal infection. Most commonly, CMV will infect the placenta where it is then transmitted to the fetus.

Primary CMV infection in a pregnant woman may cause a mild febrile illness and other nonspecific symptoms such as a sore throat, headache, and fatigue. It is generally not clinically apparent in about 90% of cases, and no vaccine is available to prevent infection in women who test negative for the virus. The authors do not recommend routinely screening pregnant women for CMV infection.

The prevention of CMV disease in the fetus/newborn is of great importance due to the possible devastating consequences of this infection. Preventive measures are primarily based on good personal hygiene, such as hand washing with soap and water after changing diapers or when around children using tissues for a runny nose. Pregnant women should also avoid sharing food and drinks with young children. Countertops coming into contact with children's saliva or urine should also be thoroughly cleaned. The use of CMV-negative blood products when transfusing seronegative pregnant women and newborns is critically important as well. During pregnancy, there is no treatment proven to be effective for prevention of fetal disease.

Sheffield, JS, Boppana, SB. Cytomegalovirus infection in pregnancy. In: UpToDate, Rose, BD (Ed), UpToDate, Waltham, MA, 2014.

- Contributed by Mona Brown Ketner RN, MSN

7. Fall 2014 Northwest AHEC Perinatal Continuing Education

Upcoming Classroom Programs:

NC Lactation Educator Training Program, August 26 - 28 & Dec 3 - 4, NW AHEC

After Discharge: Maternal and Infant Assessment in the Home, September 4, NW AHEC

Basic Fetal Monitoring, September 9, NW AHEC

Advanced Fetal Monitoring, October 14, NW AHEC

Inpatient OB Certification Review Course, September 18 & 19, SEAHEC, Wilmington

S.T.A.B.L.E./What To Do After Neonatal Resuscitation, October 17, NW AHEC

32nd Annual Gravidas at Risk Perinatal Conference, November 18 & 19, Hickory

Enduring Online Courses:

Fetal Heart Rate Auscultation

Diabetes and Pregnancy
Neonatal Abstinence Syndrome: What to Do?

Postpartum Hemorrhage and Bleeding Disorders During Pregnancy

Perinatal Post Newsletter

Counseling for Change: An Online Tobacco Cessation Course

Visit www.northwestahec.org to register

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Please also view Northwest AHEC’s 40th Anniversary videos at: http://nwahec.org/40a