Minnesota Hospital Association

Neonatal Abstinence Syndrome (NAS) Toolkit

Risk Factors, Assessment and Treatment

The MHA Perinatal Committee convened a work group of perinatalogists and neonatologists with the goal to better identify, screen and treat Neonatal abstinence syndrome (NAS). The work group developed a template for members to consider as they develop their policy and procedures. Each institution must customize their approach based on patient characteristics and needs, staff considerations and legal analysis of current Minnesota statutes.

Neonatal Abstinence Syndrome (NAS)

- Clinical diagonsis resulting from the abrupt discontinuation of fetal exposure to licit and/or ilicit substances that were used by the mother during pregnancy (Kocherlakota, 2014)
- Rarely fatal, however withdrawl symptoms can be intense and result in longer hospital stays (Kocherlakota, 2014)
- Commonly associated with use of opioids, however can also be seen with use of sedatives, barbiurates and alcohol (Tierney, 2013)
- Develops in 55-94 percent of infants who are exposed to these substances (Tierney, 2013)

Risk Factors Associated with NAS

Consider completing risk assessment screening tool when risk factors are present.

For the "Perinatal Illicit Substance Exposure Risk Assessment Tool," see appendix A (Adopted from Iowa Guidelines for Perinatal Services, Eighth Edition, Appendices, 2013)

Maternal risk factors during current pregnancy

- Mother tested positive for use of reportable substances during this pregnancy
- Mother declines drug testing
- Current or prior illicit or unprescribed drug use including maternal self-report
- Altered mental status suggestive of influence and/or withdrawal from drug(s)
- Physical signs suggestive of drug use such as IV track marks, visible tooth decay, sores on face, arms or legs
- Conditions possibly attributable to drug use: CVA, MI, HTN not explained by chronic HTN or hypertensive disorder of pregnancy
- Previous infant exposure to prenatal drug use including prior child with fetal alcohol syndrome
- Active alcohol use during current pregnancy
- Active tobacco use during current pregnancy
- Unexplained hepatitis B or C, syphilis or HIV within the last 3 years (Iowa Guidelines for Perinatal Services, Eight Edition, Appendices, 2013)
- No or unknown/undocumented prenatal care, late prenatal care (>16 weeks at presentation) and/or poor prenatal (≤ 4 visits)

- Obstetrical events: placental abruption, previous unexplained fetal demise, stillbirth, precipitous delivery, and out of hospital birth
- Unexplained poor maternal weight gain during pregnancy
- Utilization of emergency room and/or health care visits triggering prescription monitoring program (PMP) query
- Currently enrolled in a substance abuse treatment program

Social risk factors

- Current or history, within the past 3 years, of domestic violence by current partner
- History of child abuse, neglect, and/or prior child protective services involvement
- History/current incarceration
- Maternal partner substance abuse
- Request of county or tribal child protection agency

If risk factors are present

- Complete a maternal urine drug screen and/or neonate screening
    - Ordering service is responsible for follow up of test results and subsequent needed actions
    - Informed consent:
        - The importance of clear and honest communication with the woman regarding drug testing
        - All women should be informed about planned medical testing
        - Explain and document reasons for testing
- Provide mother with support in a nonjudgmental and compassionate environment
    - Research indicates that mothers who receive treatment and support during pregnancy have a better prognosis for recovery from addiction, which improves neonate outcomes
- Request social work consultation
    - Information on substance abuse treatment centers can be found at:
        - http://mn.gov/dhs/people-we-serve/adults/health-care/substance-abuse/
        - http://www.marrch.org/
- Communicate the risk status and support plan with the health care team

Screening

- Maternal urine drug screen
- Neonate screening
    - Urine testing
        - results of test are rapid
        - detection window only a few days, can result in false-negatives related to rapid clearance
    - Meconium testing
        - results may take several days
        - detection window from 20 weeks to gestational age; light and temperature sensitive
        - combination of maternal urine and neonate meconium yield best results
    - Umbilical cord testing
        - sample is always available
        - requires 6 inches of cord, provides accurate history of prenatal exposure, may also pick up on medications given during labor and delivery

Onset of Withdrawal Symptoms

- Onset of neonate withdrawal depends on half-life of substance/drug, duration of use and time of last maternal dose (University of Iowa, 2013).
- "In general infants born at term, infants with *good* birth weight, polydrug-exposed neonates, and infants with delayed drug metabolism are more prone to severe and prolonged withdrawal" (Kocherlakota, 2014).
    - As the gestational age increases so does the transmission of opioids (Kocherlakota, 2014).
    - Preterm neonates often experience less incidence and severity of withdrawal symptoms (Kocherlakota, 2014).

Table 1

Table 1 provides general guidance on onset and duration of withdrawal symptoms

Drug	**Approximate time to onset of withdrawal symptoms**
Opioids	
Heroin	24-48 hours; duration of withdrawal up to 8-10 days; earlier shorter withdrawal compared to prescription opioids
Opioids	36-72 hours; duration of withdrawal up to 10-30 days
Buprenorphine	36-60 hours; duration of withdrawal up to 28 or more days; onset maybe delayed especially with higher doses
Methadone	48-72 hours; duration of withdrawal up to 30 or more days; later onset and longer withdrawal
Nonopioids	
Alcohol	3-12 hours
Methamphetamines	24 hours; duration of withdrawal up to 7-10 days; can see immediate withdrawal
TCAs	24-48 hours; duration of withdrawal up to 2-6 days
SSRIs	24-48 hours; duration of withdrawal up to 2-6 days
Inhalants	24-48 hours; duration of withdrawal up to 2-7 days

Neonate Clinical Signs Consistent with Withdrawal

- Central nervous system
    - High pitched cry, irritability, unexplained/excessive jitteriness, hypertonia, disorganized sleep, sneezing, hiccups, unexplained seizures, CVA or other vascular accident, NEC in full-term newborn
    - Seizures occur in 2 to 11 percent and are a serious manifestation of withdrawal. These should be treated immediately (Kocherlakota, 2014).
- Autonomic nervous system
    - Unexplained apnea, unexplained SGA based on gestational age, diaphoresis, fever, mottling, temperature instability, mild elevations in respiratory rate and blood pressure
- Gastrointestinal
    - Drooling, diarrhea, vomiting, poor feeding, poor weight gain, uncoordinated and constant sucking
- Other
    - Congenital abnormalities suspected to be related to maternal drug use or excessive substance use such as alcohol

Assessment of Neonate

Assessment Tool	Description	Validation
Finnegan Neonatal Abstinence Severity Score (NASS)	32 items; each assigned a weight from 1 to 5 points based on potential for clinically adverse effects. Infants are scored two hours after birth, and then every four hours for the first five days of life, or until symptoms abate. It is recommended that pharmacologic treatment be initiated if the neonate scores eight or more on three consecutive scorings.	Evaluated in two different groups of neonates with NAS. Treatment time and length were found to decrease in the NAS scoring group and significantly fewer of these neonates required drug treatment. Inter-rater reliability ranged from 0.75 to 0.96.
Modified Finnegan Neonatal Abstinence Severity Score	21 items from the original Finnegan organized within three categories (central nervous system, gastrointestinal, and metabolic). The same scoring process and cut-off points for treatment is used.	Although this scoring system is used extensively, there are no validation studies. Resource available to support staff education and inter-rater reliability: http://neoadvances.com/
Neonatal Drug Withdrawal Scoring System, also called the Lipsitz	11 clinical symptoms. A total value of greater than four is an indication of significant signs of withdrawal. The scoring is performed twice each day, one hour after feeding. This tool was included in the 1998 American Academy of Pediatrics statement on neonatal drug withdrawal.	The only validation study that is available is the original study that is more than 30 years old. In this case control study, inter-rater reliability of 0.92 and 77% sensitivity was reported.
Neonatal Narcotic Withdrawal Index (NNWI)	Seven indicators rated on a 0 to 2 point scale. This tool was developed to primarily measure symptoms related to neonatal withdrawal from methadone.	The only validation study is the original study. Validity was determined by comparing the scores of 40 non-opioid-exposed infants with the scores of 50 known opioid-exposed infants during the second day of life. The scores of the opioid-exposed group were significantly higher. The scoring tool demonstrated inter-rater agreement of 71% for individual items and 90% for the total score.

Assessment Tool	Description	Validation
Neonatal Withdrawal Inventory (NWI)	Seven prominent withdrawal signs, representing the central nervous system, autonomic, gastrointestinal, and behavioral features of withdrawal. Each of the symptoms is weighted between 1 and 4; a score of eight is considered positive for narcotic withdrawal.	Three studies with 80 newborns compared the reliability, sensitivity, and specificity of the NWI with the Finnegan. Inter-rater reliability was superior to that with the Finnegan (range 0.89-0.98 versus range 0.70-0.88). With the Finnegan as the standard, the sensitivity and specificity of the NWI were 100% at syndrome detection and treatment threshold levels.

Table Source: Vermont Oxford Network (2015)

Treatment of Neonate

- Non-Pharmacologic Treatments
    - First line of treatment therapy
    - Gentle handling, on-demand high caloric (22cal/oz.) feedings, avoidance on waking sleeping infant, continuous minimal stimulation, dim light, low noise, swaddling, kangaroo care, and pacifiers
    - Actively encourage mother participation through caring non-judgmental approach, encourage infant to room in with mother
- Pharmacologic Treatments
    - Only offer when supportive non-pharmacologic treatments fail, neonate assessment scores remain high, seizures are observed, and dehydration is present (Kocherlakota, 2014).

Treatment options to consider

Medication	Advantages	Disadvantages
Morphine	No alcohol Short half-life (9h)	Sedation Apnea Constipation Frequent dosing
Methadone	Long half-life (26 h)	Longer duration of treatment Alcohol 8%
Phenobarbital	Long half-life (45-100 h) Monitor level	Possible hyperactivity High treatment failure Drug-drug interaction Sedation
Clonidine	Nonnarcotic antagonist No sedation No alcohol Long half-life (44-72 h) Monitor level	Hypotension Abrupt discontinuation may cause rapid rise of blood pressure and heart rate
Buprenorphine	Sublingual route Half-life (12 h)	Alcohol 30% Adjuvant medications required

Example treatment algorithm taken from Kocherlakota, 2014

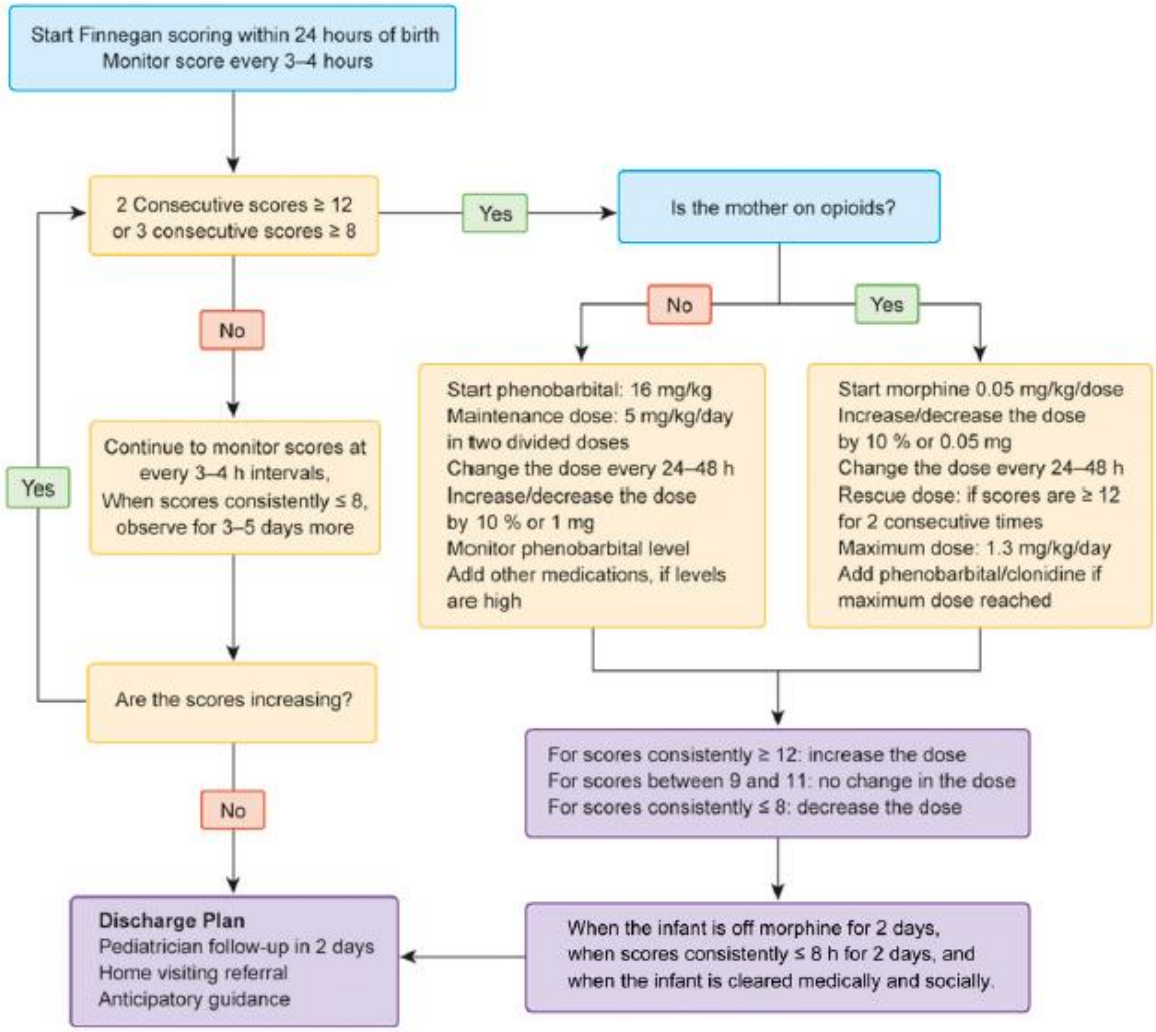

FIGURE 3

A management plan for NAS in neonates. Medications are to be initiated, increased, decreased, or discontinued depending on the Finnegan score. Morphine can be initiated at a higher dose if scores are high; for example, if the scores are 17 to 20, morphine can be started at 0.12 mg per dose, and if the scores are ≥25, morphine can be initiated at 0.20 mg per dose.[49] Morphine dose can also be escalated by >10% for higher scores.[21] Methadone can be substituted for morphine for opioid withdrawal. Cardiopulmonary monitoring of the infant is preferred during the acute stage.

Sample Policy and Procedure for Treatment of NAS

DRAFT SAMPLE POLICY/PROCEDURE

Hospital Logo

Suspected illegal drug abuse during pregnancy
Suspected drug abuse during pregnancy
Drug toxicology or alcohol testing of a pregnant woman and her newborn

Policy Number:	

I. SCOPE: per each hospital

II. PURPOSE

A. To comply with MN law regarding reporting maltreatment of minors and perinatal exposure to controlled substances (MN Statute 626.556, 626.5561, 626.5562) regarding drug toxicology or alcohol testing of a pregnant woman using a controlled substance for non-medical purposes.
B. To comply with MN law (MN Statute 626.5562 Sub 1) regarding drug toxicology or alcohol testing of a neonate known or have reason to believe to be exposed prenatally to a controlled substance.
C. To ensure mandated reporting of actual or suspected prenatal exposure to a controlled substance or alcohol to appropriate local welfare agency.

III. POLICY

A. All pregnant women will be screened using a risk assessment tool/questionnaire, see appendix A
B. A urine drug screen will be collected and tested on a pregnant woman who has one or more of the risk factors listed on the MHA Perinatal Risk assessment tool. A urine drug screen will be ordered for a pregnant woman per physician's order upon admission and any time up to and including eight hours after delivery.
C. A substance abuse screen of a newborn is required if there is reason to believe, based on the assessment of the mother or newborn, that a controlled substance was used by the mother for a non-medical purpose during pregnancy.

IV. PROCEDURE FOR MATERNAL TESTING

A. Informed Consent:
    - The importance of clear and honest communication with the woman regarding drug testing is important.
    - All women should be informed about planned medical testing.
    - Explain and document the nature and purpose of the test and how results will guide management, including possible benefits and/or consequences of the test.
    - Communicate the risk status with the health care team.

V. PROCEDURE FOR NEWBORN TESTING

A. If mother is screened or meets screening criteria, a screen will be collected from the infant.
B. The following specimens may be ordered by the provider for drug screening:
    - Urine
    - Meconium
    - Umbilical cord sample
C. Specimens will be sent chain-of-custody
D. Specific criteria for newborn testing:
    - Neonate risk factors: See Appendix/Attachment for list
E. If newborn and/or maternal risk indicators are present, testing may be done on infant without consent of parent(s).
F. Document in the infant's medical record that parents were informed, the indication(s) for the testing, and that results of the test were communicated to the parents.

VI. PROCEDURE FOR REPORTING

It is recommended that each organization consult with their legal team prior to implementation. The following are recommendations to consider on when to reporting based off of MN Statutes 626.556, 626.5561 and 626.5562.

A mandated reporter will report when a pregnant patient meets any of the following criteria:

- Positive toxicology test (administered with patient consent or when required by law)
- Patient acknowledges use
- Positive toxicology report in current or past pregnancies, if clinically relevant
- Clinically relevant history that gives the mandated reporter reason to believe there has been prenatal exposure to controlled substances/excessive alcohol
- Knowledge or reasonable belief (e.g. patient report of substance abuse, drugs found on person, drug withdrawal symptoms).

VII. DOCUMENTATION (per hospital – EMR specifics, etc.)

VIII. EQUIPMENT (per hospital)

IX. DEFINITIONS

Chain of custody: This is the procedure that references a document or paper trail showing the seizure, custody, control, transfer, analysis, and disposition of physical and electronic evidence of a human specimen test.

"Chemically-dependent person": Also means a pregnant woman who has engaged during the pregnancy in habitual or excessive use, for a nonmedical purpose, of any of alcohol or controlled substances or their derivatives: opium, cocaine, heroin, phencyclidine, methamphetamine, amphetamine, tetrahydrocannabinol, or alcohol (MN Statute 253B.02, Sub 2)

Mandated reporter: A licensed professional or professional's delegate engaged in any occupation that is licensed by a health-related board. Examples include: RN, LPN, SW, MD, DO, Dentist, Chiropractor,

Podiatrist, Psychologist, RT, OT/PT/ST, Dietician, and Other Licensed Therapists. *(each facility may determine and list others as necessary)*

MN Statute: 626.5561 "A person mandated to report under section 626.556, subdivision 3, shall immediately report to the local welfare agency if the person knows or has reason to believe that a woman is pregnant and has used a controlled substance for a nonmedical purpose during the pregnancy, including, but not limited to, tetrahydrocannabinol, or has consumed alcoholic beverages during the pregnancy in any way that is habitual or excessive. Any person may make a voluntary report if the person knows or has reason to believe that a woman is pregnant and has used a controlled substance for a nonmedical purpose during the pregnancy, including, but not limited to, tetrahydrocannabinol, or has consumed alcoholic beverages during the pregnancy in any way that is habitual or excessive. An oral report shall be made immediately by telephone or otherwise. An oral report made by a person required to report shall be followed local welfare agency. Any report shall be of sufficient content to identify the pregnant woman, the nature and extent of the use, if known, and the name and address of the reporter," within 72 hours, exclusive of weekends and holidays, by a report in writing to the local welfare agency.

Practitioner: A physician or other clinician with the appropriate credentials, who orders the procedure, administers the procedure, and/or provides medical supervision of other licensed health care practitioners.

Precipitous: The term precipitate or precipitous labor has been defined as a labor that lasts no more than three hours from onset of regular contractions to delivery

Screening: The initial step in substance abuse evaluation and is accomplished through conducting an interview utilizing a tool/questionnaire.

Testing: refers to the laboratory analysis of biological specimens (after screening). All pregnant women will be screened but not all pregnant women will be tested).

X. OTHER (72-hour hold, CPS specific, social work notification or unavailable, chemical dependency resources)

Appendix A

SAMPLE--Perinatal Illicit Substance Exposure Risk Assessment Tool
(Guidelines for Perinatal Services, Eighth Edition, 2013)

A. Obstetrics Clinic and Labor and Delivery Unit

Risk Factors Related to Current Pregnancy	
Maternal urine drug screen positive	Yes/No
Maternal report of illicit drug use	Yes/No
No prenatal care or late prenatal care (> 16 weeks gestation)	Yes/No
Poor prenatal care (≤ 4 prenatal visits)	Yes/No
Abruptio placenta	Yes/No
Unexplained premature delivery	Yes/No
Unanticipated out-of-hospital delivery	Yes/No
Unexplained discrepancy between delivery/prenatal care facilities (hospital hopping)	Yes/No
Presented at hospital in second stage of labor	Yes/No
Precipitous labor (<3 hours)	Yes/No
Unexplained episode of acute hypertension (≥140/90 mmHg)	Yes/No
Unexplained seizures, stroke or myocardial infarction	Yes/No
Tobacco/alcohol use or prescription drug (i.e. Vicodin, Oxycotin) abuse	Yes/No
Physical attributes suggesting illicit drug use such as IV track marks, visible tooth decay, sores on face, arms or legs	Yes/No
Altered mental status suggesting influence/withdrawal from illicit drugs	Yes/No
Unexplained stillbirth	Yes/No

Risk Factors Related to Maternal Medical History	
Unexplained hepatitis B or C, syphilis or HIV within the last 3 years	Yes/No
Untreated maternal depression or major psychiatric illness within the last 3 years	Yes/No
Ever used illegal drugs during any pregnancy	Yes/No
Ever delivered an infant who tested positive for illicit drugs	Yes/No

Risk Factors Related to Maternal Social History	
History of illicit drug use by mother or partner within the last 3 years	Yes/No
History of illicit drug rehabilitation by mother or partner within the last 3 years	Yes/No
History of domestic violence by partner within the last 3 years	Yes/No
History of child abuse, neglect, or court ordered placement of children outside of home	Yes/No

This risk assessment should take place at the first encounter with the pregnant woman and at delivery. At other encounters the staff should document that the pregnant woman continues to be abstinent. If any of the above questions is answered with a YES, please do the following:

- Request informed consent from the mother to order urine screening for illicit drugs
- Contact the unit social worker to initiate detailed psychosocial assessment
- Request chemical dependency services consult if the social worker and the physician believe it is warranted
- Request psychiatry consult if mental health problems recognized
- Communicate the risk status with Newborn Nursery or NICU staff verbally (for Labor and Delivery staff)
- Attach a copy of this form to Labor and Delivery Form and send to the Newborn Nursery or NICU along with the baby

B. Newborn Nursery/NICU (please review maternal risk assessment from L&D unit)

Risk Factors Related to Newborn Assessment	
Maternal risk factor(s) present	Yes/No
Mother was tested during this pregnancy or labor for illicit drugs	Yes/No
Mother tested positive for illicit drugs during this pregnancy	Yes/No
Gestation ≤37 weeks from unexplained preterm delivery	Yes/No
Unexplained birth weight less than 10th percentile for gestational age	Yes/No
Unexplained head circumference less than 10th percentile for gestational age	Yes/No
Unexplained seizures, stroke or brain infarction	Yes/No
Unexplained symptoms that may suggest drug withdrawal/intoxication: high pitched cry, irritability, hypertonia, lethargy, disorganized sleep, sneezing, hiccups, drooling, diarrhea, feeding problems, or respiratory distress	Yes/No
Unexplained congenital malformations involving genitourinary tract, abdominal wall or gastrointestinal systems	Yes/No

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