HSHS St. Vincent St. Mary's St. Nicholas

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FACILITY:	HSHS St. Vincent Hospital HSHS St. Mary's Hospital HSHS St. Nicholas Hospital	**MANUAL:** Provision of Care, Treatment and Services
TITLE: **Neonatal Abstinence Syndrome**		**ORIGINATING DEPARTMENT:** Women's and Children
SUPERSEDES:	SVGB New SMGB New SNS WI-040 of 10/13	**POLICY NUMBER:** WI-059

I. POLICY:

Neonatal Abstinence Syndrome (NAS) describes a constellation of symptoms of withdrawal that may occur in an infant following in utero exposure to opioids.

II. PURPOSE:

To develop a standardized approach to the management of infants with NAS

III. GUIDELINES/PROCEDURES:

A. Parent Education

1. Ideally, parent education should begin prior to inpatient stay for delivery

    a. Any pregnant woman with fetus at risk for NAS should have consultation with neonatology and/or case management and tour NICU

        i. Parent to receive Wisconsin Association for Perinatal Care (WAPC) handout and be consulted regarding the time frame of withdrawal, likelihood of pharmacotherapy requirement, and education regarding breast feeding
        ii. Parent should be presented with list of parenting expectations by case management

    b. Any mother admitted to L&D with expected delivery and known history of opioid use will meet with neonatology and/or case management prior to delivery or as soon as possible thereafter

B. Screening

1. Any mother with a prenatal history of opioid use either by prescription or illicit use, should have a urine drug screen performed and infant should have both urine and meconium toxicology screens sent

    a. Note to provider: urine toxicology screening reflects opioid use within the past two days
    b. Meconium toxicology reflects use within the last two trimesters.

        i. Meconium toxicology results will take 1-3 days upon specimen arrival to Mayo Labs. If there is a positive result, confirmatory testing will be performed thus delaying final results.
        ii. Results may not be available when infant has otherwise met discharge criteria. Discharge should not be delayed pending results; however, positive results for an illicit substance should trigger a Child Protective Services (CPS) referral by provider after discharge. If positive results are available while inpatient, case management will make referral.

2. Without a confirmed history of opioid exposure, any infant meeting one major criterion or two minor criteria from the following list should have urine and meconium toxicology studies sent due to an increased risk of opioid exposure:

a. Major Criteria:
   i. Any Safe Haven infant
   ii. Current or past CPS involvement with family
   iii. Infrequent (<3), late (3rd trimester) or no prenatal visits
   iv. Mother seeking prenatal care from multiple providers in different health systems
   v. Mother requesting early discharge against medical advice
b. Minor Criteria:
   i. Precipitous labor
   ii. Cigarette smoking at any time during pregnancy
   iii. Placental abruption
   iv. Unexplained maternal mental status changes
   v. History of maternal cerebrovascular accident

3. Any positive screening study for an unprescribed opioid or illicit substance warrants a Child Protective Services (CPS) referral
4. Case management should be involved with all cases of in utero opioid exposure regardless of whether opioid was prescribed

C. Designation

1. Dependent upon type of opioid exposure, symptoms of withdrawal are expected to present within 24 hours to 7 days or longer following infant's last exposure. The average time of presentation is around 3 days after birth. Otherwise healthy infants will first be admitted to the well newborn nursery
2. All infants that meet screening criteria (one major or two minor criteria as described in Section B) will have Finnegan scoring described in Section D.

   a. If infant has 2 consecutive scores ≥ 8, notify care provider and transfer to NICU
      i. Infant will be placed on central cardiorespiratory monitoring
      ii. Finnegan scoring will continue as described in Section D
      iii. Pharmacotherapy will be initiated at the discretion of the neonatologist based on Pharmacotherapy Guidelines as described in Addendum 1
   b. Infants that do not meet NICU admission criteria will be observed in the well newborn nursery for a mandatory length of stay based upon risk factors as described in Algorithms 1-3
   c. Provider should note that maintaining the integrity of the mother-infant dyad is beneficial for attenuating withdrawal symptoms
      i. Should disruption of dyad become necessary for NICU admission, parent should be encouraged to participate in cares and be present at infant's bedside as much as possible
      ii. Partners in Caring meal passes are available to assist in the cost of meals for mothers. Meal passes are provided to those mothers that are committed to being at their baby's bedside for every feeding. Staff will expect that a parent is present for all feedings unless previous arrangements have been made with the medical team
      iii. Every effort should be made to keep an infant at risk for NAS in a dark, quiet environment with minimal stimulation

D. Finnegan Scoring

1. Institute Finnegan scoring on any infant meeting screening criteria within 2 hours of birth to establish a baseline score
   a. Scoring should be done following feeding and reflective of the time interval between scores
   b. Do not awaken infant to perform scoring
   c. A crying infant should be soothed and quieted before assessing muscle tone, Moro reflex and respiratory rate
   d. Following the baseline score, all infants should be scored following feeds at 2-4 hour intervals
   e. Document the Finnegan score in the electronic medical record

f. An infant in the well newborn nursery with two consecutive scores ≥ to 8 will be transferred to the NICU and pediatric provider will be notified. Note: any score ≥ to 8 should be reviewed and confirmed by another nurse or provider trained in Finnegan scoring

E. Feeding

1. Breast feeding or breast milk by bottle has been shown to decrease symptoms of withdrawal. Infants fed breast milk are less likely to require pharmacotherapy; those that do, have shorter treatment courses and require less cumulative dosage of opioid to attenuate symptoms

   a. Mothers on maintenance therapy with Methadone or Buprenorphine (Subutex) should be encouraged to give breast milk by bottle or breast regardless of maternal medication dosage
      i. Although the product insert indicates maternal Buprenorphine therapy is a contraindication to breast feeding, it is the position of both American Congress of Obstetricians and Gynecologists (ACOG) and American Academy of Pediatrics (AAP) that breast feeding should not be discouraged
   b. Maternal Hepatitis C positivity should not be considered a contraindication to breast feeding unless mother's nipples are cracked or bleeding.
   c. Care provider should be advised that comorbid drug abuse is common.

      i. Positive toxicology reports for amphetamine, barbiturates, benzodiazepines or other opioids and the contraindication to breast feeding must be addressed on an individual basis. Provider is referred to the following available references:
         - TOXNET NIH website http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?LACT
         - Medications and Mothers' Milk: A Manual of Lactational Pharmacology by Thomas Hale
         - Infant Risk Center: (806) 352-2519
         - Lactation Study Center: (585) 275-0088

      ii. If there is a history of maternal cocaine or PCP abuse, or if mother or infant's urine toxicology is positive for cocaine, infant should not be breastfed
         - If meconium toxicology returns positive for cocaine or PCP, breast feeding should not occur or should discontinue
         - If there is a presumptive positive for cocaine or PCP, hold breast feeding until final results are available
         - Use of breast milk should be strongly discouraged if there is a positive maternal or infant urine drug screen for THC or if mother admits to marijuana use within 30 days of delivery
         - If meconium is positive for THC but mother denies use within 30 days of delivery, counsel mother regarding the risks of marijuana exposure for infant brain development and the importance of continued abstinence
         - For mothers wishing to breast feed but acknowledging marijuana use < 30 days prior to delivery, provide the recommendation to pump and discard breast milk until at least 30 days has lapsed since last use.
   d. For mothers unwilling to provide breast milk or in circumstances where there are other contraindications, formula should be administered
      i. Care provider should note increased caloric expenditure of infants in withdrawal and potential need for increased calorie formula
      ii. At this time, there is no conclusive evidence for the superiority of one formula over another in feeding babies with NAS
   e. Provider should note that excessive oral intake as well as gastrointestinal effects of opioid withdrawal contribute to perianal skin breakdown and that preemptive barrier cream application of 10% cholestryramine in Aquaphor should be applied to perianal area with each diaper change

F. Therapy

1. Non-Pharmacologic Therapy - Primary treatment of NAS should be supportive; these measures include but are not limited to:

   a. Swaddling and maximizing skin to skin care with parent

i. If parent unavailable, arrange for "cuddler"
b. Encourage provision of breast milk unless otherwise contraindicated
c. Use of pacifier
d. Reduction of ambient light and noise
e. Avoidance of unnecessary handling
f. Use of infant swing

2. See Addendum 1 for Guidelines for Pharmacologic Therapy

G. Discharge

a. Assure case management involvement during inpatient stay and stable home situation prior to discharge
   i. If a Child Protective Services (CPS) case has been opened, assure clearance with CPS case worker prior to discharge
b. Monitor all opioid exposed infants not requiring pharmacotherapy for a minimum length of stay as indicated by risk category per policy (Algorithms 1-3)
c. Infants should have follow up with primary care physician in 1-2 days following discharge
d. If infant is discharged on methadone, arrange for 1 week supply dispensed from SVG pharmacy and availability of further supply from outpatient pharmacy which should be noted in discharge summary
e. Schedule NICU follow up clinic per occupational therapist recommendations
f. Make a Birth-to-Three referral for all infants requiring pharmacotherapy for NAS. Referral should otherwise be at the discretion of the attending physician

IV. REFERENCES:

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2. Hall ES, et al. A multicenter cohort study of treatments and hospital outcomes in neonatal abstinence syndrome. Pediatrics. 2014 Aug;134(2):e527-34.
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V. CONCURRENCES:

Director, Women's Health, SMGB
Director, Women's Health, SVGB
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Originator: *Signature on file*
Dr. Robert M. Rock, Neonatology

Administrative Approval: *Signature on file*
Jamie Babbitts, Executive Director, Women's and Children

Addendum 1

A. Pharmacologic Therapy

1. Provider should note that the goal of pharmacotherapy is not to completely alleviate all symptoms of withdrawal but rather to attenuate symptoms to the degree to which infant is able to:

    a. be free from seizure activity
    b. maintain a stable core body temperature
    c. exhibit typical feeding behavior for infant's gestational age
    d. be consolable between feedings
    e. demonstrate weight gain.

2. Morphine is the first line agent for pharmacotherapy. The standard morphine dilution is 1mg/ml. When weaning, for doses < 0.1mg, pharmacy should dilute morphine to 0.1mg/ml.

    a. Note to provider: the concentrations and below dosing are for oral formulation. Oral bioavailability is 20-40%. Thus, IV is 3-5x more potent than PO. For an infant in withdrawal not on at least 100ml/kg oral feeds, initiate IV dosing with 0.02 mg/kg per dose. If dosage increase needed, increase by 10%. Do not follow below increase schedule.

3. Consider initiation of pharmacotherapy should infant exhibit 3 Finnegan scores of ≥ 8 or 2 scores ≥ 12
4. All infants requiring pharmacotherapy should be placed on cardiorespiratory monitoring with a saturation probe

    a. Start therapy with a single dose of oral morphine 0.04mg/kg

        i. If repeat score is ≥ to 8, schedule therapy of 0.04mg/kg q3hr
        ii. Note that with q3hr dosing, morphine effect will be cumulative. Allow at least 24hr on above dose before increasing therapy. Provider can give q2-3hr PRN dose of morphine 0.04mg/kg to attenuate symptoms in the meantime

    b. If scores remain > 8 on scheduled therapy of above dose for 24hr, increase dosage to 0.08mg/kg q3hr. Maintain on this dose for at least 24hr, administering q2-3hr PRN dose of morphine 0.04mg/kg as needed to attenuate elevated scores.
    c. If scores remain >8 on scheduled therapy of above dose for 24hr, increase dosage to 0.12 mg/kg q3hr. Maintain on this dose for at least 24hr, administering q2-3hr PRN dose of morphine 0.04mg/kg.
    d. Continue to increase dose by 0.04mg/kg until reaching a maximum dosage of 0.28mg/kg. If scores remain poorly attenuated, add adjunctive therapy

        i. First line adjunctive therapy is Phenobarbital
            - Administer loading dose of 15mg/kg PO and then start maintenance therapy of 5mg/kg PO daily 24hr after loading dose

B. Weaning Therapy – Once at a steady state for at least 24hr with Finnegan scores < 8, provider should attempt to wean off morphine therapy.

1. Maintain infant at q3hr dosing interval and first wean total dosage by 0.01mg/kg
2. Allow 24hr following each wean of scores <8 before weaning again
3. When infant is weaned to ~0.01mg/kg, lengthen the dosing interval to q6hr x 24hr, then q8hr x 24hr, then q12hr x 24hr, q24hr x 24hr and then off
4. If at any point during weaning process, infant exhibits more severe withdrawal symptoms, hold current schedule or revert back to dosage prior to last wean for 24hr before attempting further weaning
5. Provider should make at least 2 attempts at weaning off opioid prior to initiating methadone maintenance therapy
6. Provider should observe infant for at least 48hr after last morphine dose prior to discharge

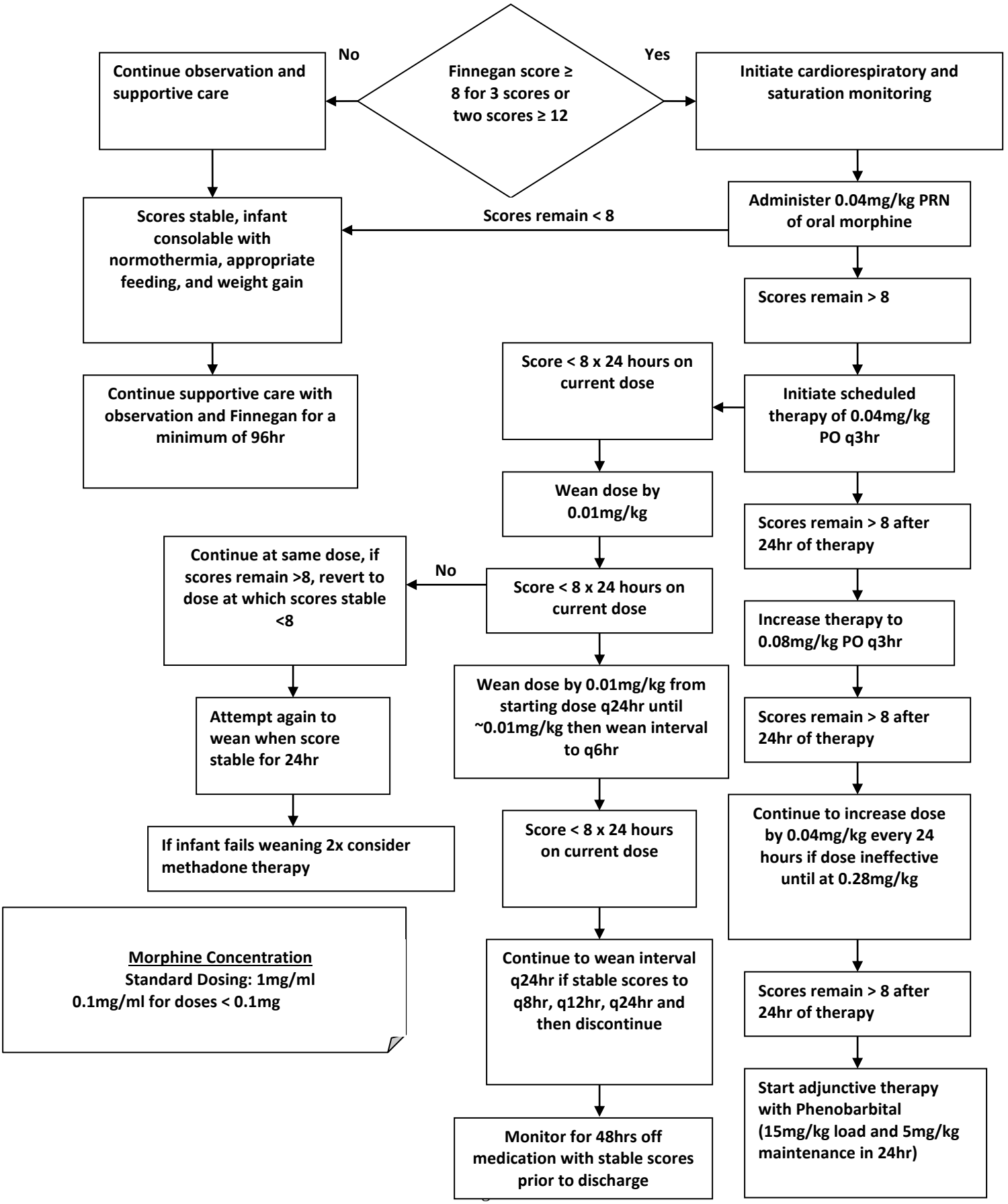
C. Initiation of Methadone

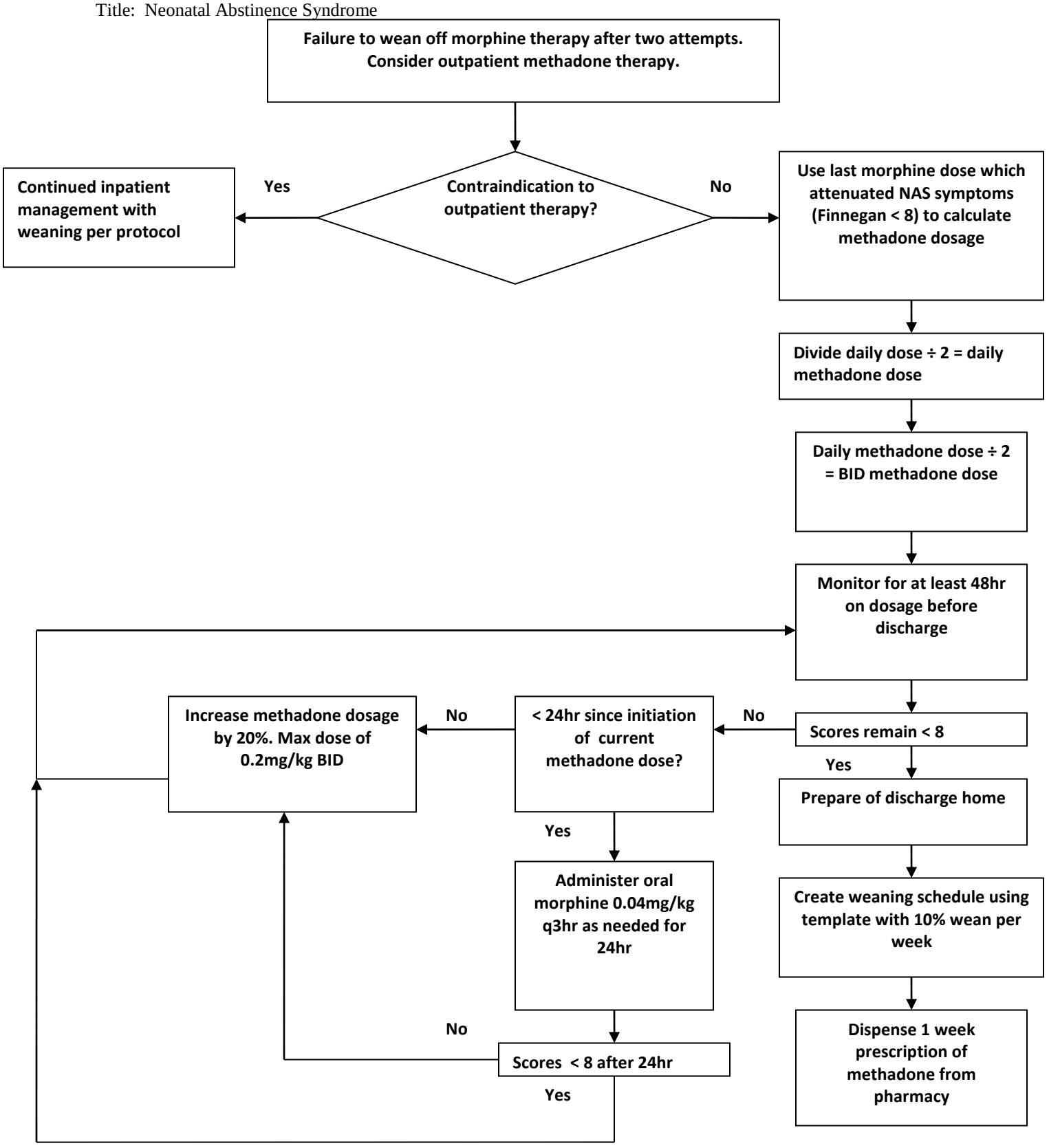
1. Methadone (1mg/ml) is the preferred outpatient therapy. Contraindications to outpatient methadone therapy are: primary care provider unwilling to manage wean, inability to secure pharmacy willing to dispense methadone, primary caretaker deemed unreliable to administer methadone by provider or family member unwilling to administer methadone at home.

    a. Consider initiating methadone following 2 failed weaning attempts

        i. Calculate methadone dosage based on total steady state daily morphine dose. Conversion is around 2:1. Divide daily oral morphine by 4 (2:1 conversion and BID dosing). Dosing should range from 0.05-0.2mg/kg BID.
            - For example: infant is on 0.04mg/kg q3hr of oral morphine and infant weighs 3kg. Total daily dose is 0.96mg oral morphine. Oral methadone should be 0.24mg PO BID or 0.08mg/kg BID
            - Observe infant for at least 48hr of scores <8 prior to discharge.
            - Methadone has a long half-life and dosing accumulates in infant's system with BID dosing. If dose is ineffective await at least 24hr before increasing dose. If < 24hr may use oral morphine q3hr PRN 0.04mg/kg to attenuate symptoms
            - In dosage is ineffective and >24hr, increase dosage by 20% and observe for at least 24hr before further modification. Continue 20% increase every 24hr until scores stable with a maximum dose of 0.2mg/kg methadone BID. Observe for 48hr on dose before discharge.
            - Discharge with 1 week prescription of methadone dispensed from SVG pharmacy. Assure availability of outpatient pharmacy willing to dispense methadone prior to discharge
            - Devise tapering schedule. Use attached form
                - Prescribe supply sufficient for 1 week
                - Wean by 10% of initial dose each week until infant is at 0.05mg/kg (current weight) BID for 1 week, then drop AM dose and continue on 0.05mg/kg daily x 1 week before discontinuing
            - If infant excessively fussy, feeding poorly or not gaining weight, revert back to prior dose and wean in 1 week

Title: Neonatal Abstinence Syndrome





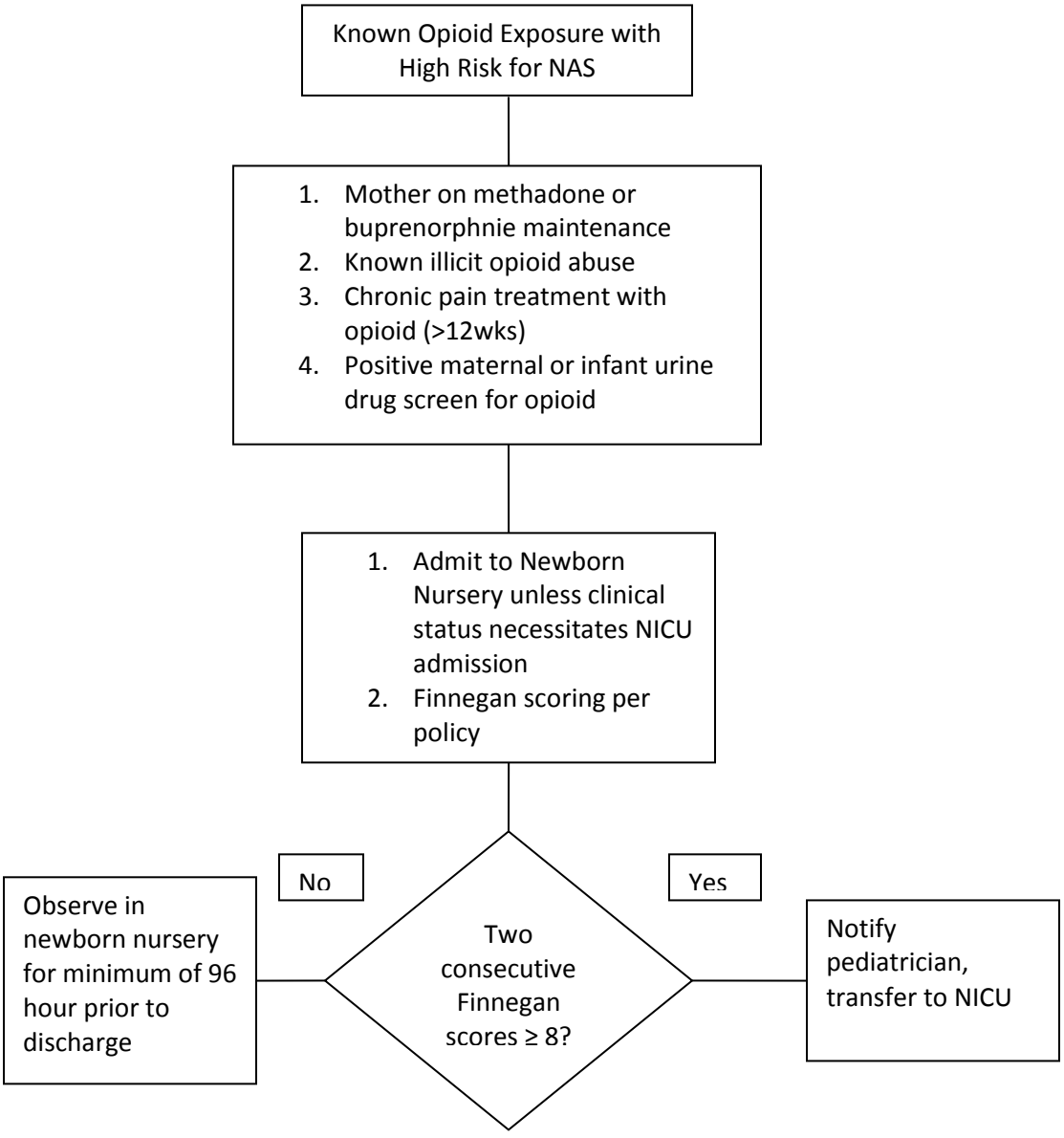
Methadone Concentration
Standard Dosing: 1mg/ml

Methadone Weaning Schedule

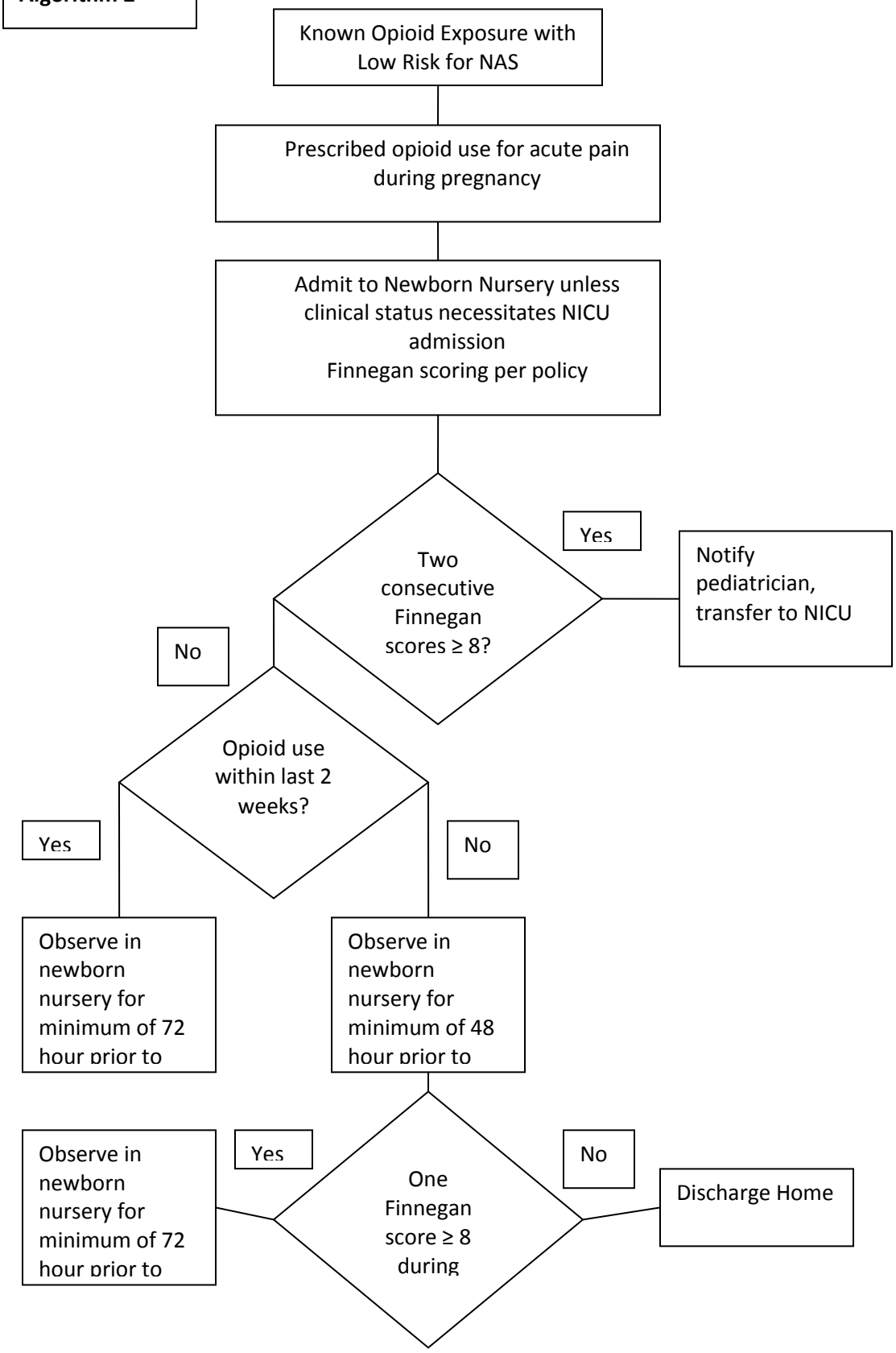
Patient Name: _____ Methadone Concentration: 1mg/ml
Discharge Weight:_____kg

Date:	AM Dose:	PM Dose:
Week 1:		
Week 2:		
Week 3:		
Week 3:		
Week 4:		
Week 5:		
Week 6:		
Week 7:		
Week 8:		
Week 9:		
Week 10:		

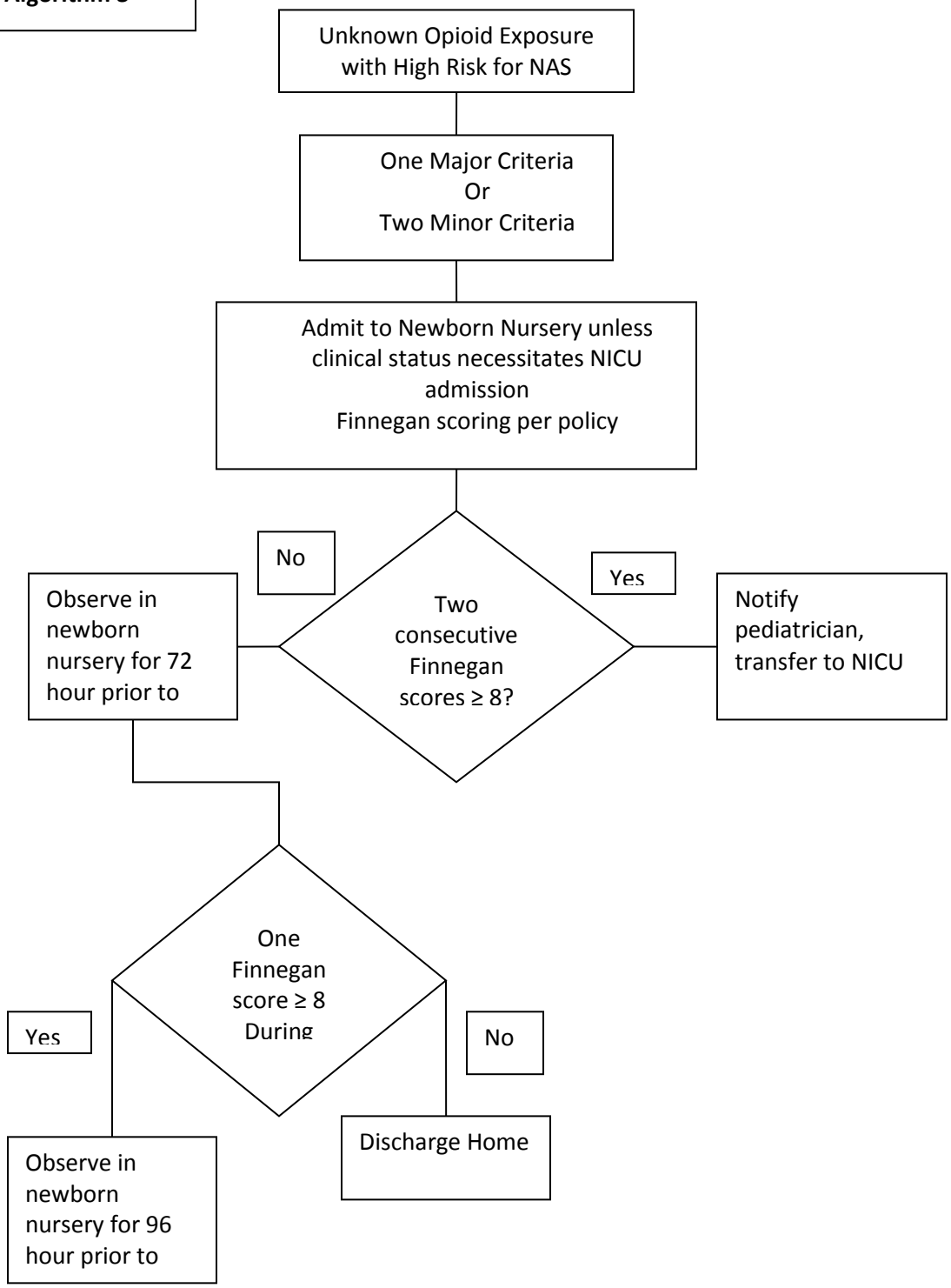
Algorithm 1


Known Opioid Exposure with High Risk for NAS
1. Mother on methadone or buprenorphnie maintenance
2. Known illicit opioid abuse
3. Chronic pain treatment with opioid (>12wks)
4. Positive maternal or infant urine drug screen for opioid
1. Admit to Newborn Nursery unless clinical status necessitates NICU admission
2. Finnegan scoring per policy
Two consecutive Finnegan scores ≥ 8?
No
Yes
Observe in newborn nursery for minimum of 96 hour prior to discharge
Notify pediatrician, transfer to NICU

Algorithm 2


Known Opioid Exposure with Low Risk for NAS
Prescribed opioid use for acute pain during pregnancy
Admit to Newborn Nursery unless clinical status necessitates NICU admission
Finnegan scoring per policy
Two consecutive Finnegan scores ≥ 8?
Yes
Notify pediatrician, transfer to NICU
No
Opioid use within last 2 weeks?
Yes
No
Observe in newborn nursery for minimum of 72 hour prior to
Observe in newborn nursery for minimum of 48 hour prior to
One Finnegan score ≥ 8 during
Yes
No
Observe in newborn nursery for minimum of 72 hour prior to
Discharge Home

Algorithm 3


Unknown Opioid Exposure with High Risk for NAS
One Major Criteria Or Two Minor Criteria
Admit to Newborn Nursery unless clinical status necessitates NICU admission
Finnegan scoring per policy
Two consecutive Finnegan scores ≥ 8?
No
Yes
Observe in newborn nursery for 72 hour prior to
Notify pediatrician, transfer to NICU
One Finnegan score ≥ 8 During
Yes
No
Observe in newborn nursery for 96 hour prior to
Discharge Home