## Important NICU numbers and codes

### NICU Codes

<table>
<thead>
<tr>
<th>NICU</th>
<th>Code</th>
<th>NICU NUMBERS:</th>
</tr>
</thead>
<tbody>
<tr>
<td>OR</td>
<td>3680</td>
<td>NICU Main #</td>
</tr>
<tr>
<td>Break Room</td>
<td>183</td>
<td>NICU Fax #</td>
</tr>
<tr>
<td>Female Locker</td>
<td>183</td>
<td>Resident Rm</td>
</tr>
<tr>
<td>Male Locker</td>
<td>152</td>
<td>NNP Office</td>
</tr>
<tr>
<td>Conference Room</td>
<td>755</td>
<td>Resident Call</td>
</tr>
<tr>
<td>Call Room</td>
<td>34512/159</td>
<td>Attending Call</td>
</tr>
</tbody>
</table>

### NICU Numbers

<table>
<thead>
<tr>
<th>NICU</th>
<th>NICU MAIN #</th>
<th>NICU FAX #</th>
</tr>
</thead>
<tbody>
<tr>
<td>OR</td>
<td>619-532-8910</td>
<td>619-532-5241 / 8914</td>
</tr>
<tr>
<td>Break Room</td>
<td>2-8913</td>
<td></td>
</tr>
<tr>
<td>Female Locker</td>
<td>2-5330</td>
<td></td>
</tr>
<tr>
<td>Male Locker</td>
<td>2-8900 / 8899 (NICU)</td>
<td>2-8913 (3N)</td>
</tr>
<tr>
<td>Conference Room</td>
<td>2-8932 (NICU)</td>
<td>2-0282 (3N)</td>
</tr>
</tbody>
</table>

### Frequently called Numbers

<table>
<thead>
<tr>
<th>Service</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor Deck</td>
<td>2-8865/8864</td>
</tr>
<tr>
<td>3 North</td>
<td>2-6275</td>
</tr>
<tr>
<td>3 North Nursery</td>
<td>2-8917 / 2-7612</td>
</tr>
<tr>
<td>3 East</td>
<td>2-9946</td>
</tr>
<tr>
<td>2 East</td>
<td>2-6250</td>
</tr>
<tr>
<td>PICU</td>
<td>2-8153</td>
</tr>
<tr>
<td>Nursery Pager</td>
<td>619-602-2678</td>
</tr>
<tr>
<td>NICU Pharmacy</td>
<td>2-6310</td>
</tr>
<tr>
<td>Blood Bank</td>
<td>2-9357 / 2-9356</td>
</tr>
<tr>
<td>Main Lab (CORE)</td>
<td>2-9200</td>
</tr>
<tr>
<td>Micro</td>
<td>2-9234</td>
</tr>
<tr>
<td>Mail-Out</td>
<td>2-9271</td>
</tr>
<tr>
<td>Hematology (differential)</td>
<td>2-9283 / 2-7010 / 2-6311</td>
</tr>
<tr>
<td>Children's PCR LAB</td>
<td>858-966-7457 / 5940</td>
</tr>
<tr>
<td>UCSD (Viral Culture)</td>
<td>858-957-5785</td>
</tr>
<tr>
<td>NHCP Nursery</td>
<td>760-725-0445 / 5108</td>
</tr>
<tr>
<td>NHCP LAB</td>
<td>760-725-1490 / 1503</td>
</tr>
<tr>
<td>Quest</td>
<td>619-686-3186</td>
</tr>
<tr>
<td>Newborn Screen / Perkin Elmer</td>
<td>866-463-6436</td>
</tr>
<tr>
<td>Rady Newborn Screen</td>
<td>858-966-8708</td>
</tr>
<tr>
<td>UCSD Genetics</td>
<td>858-534-1352 / 4308</td>
</tr>
<tr>
<td>Inpatient Pharmacy</td>
<td>2-8596</td>
</tr>
<tr>
<td>Lactation</td>
<td>2-5261 / 7745</td>
</tr>
<tr>
<td>Audiology</td>
<td>2-9602</td>
</tr>
<tr>
<td>Fisher House</td>
<td>2-9055</td>
</tr>
<tr>
<td>Ultrasound Technician</td>
<td>2-8746</td>
</tr>
<tr>
<td>X-ray Portable</td>
<td>619-453-6385</td>
</tr>
<tr>
<td>Pediatric Radiology</td>
<td>2-6317 / 7382</td>
</tr>
<tr>
<td>Synagis Clinic Phone</td>
<td>619-847-5027</td>
</tr>
</tbody>
</table>

To hear radiology dictations: 2-7408. Enter #1, enter 99 for user ID, and enter the eight digit radiology exam numbers.
NICU overview

The Neonatal Intensive care unit at the Naval Medical Center San Diego is a 32 bed, level III NICU. The NICU provides comprehensive care to virtually all newborns who require an ICU admission. Infants requiring cardiothoracic surgery and ECMO will be transferred out. The working team is made up of neonatologists, neonatal nurse practitioners, a rotating pediatric resident (NICMO or NICU complicated), pediatric interns, family practice residents, ER fellows, and OB interns. We are supported by excellent nurses and corpsmen, a dedicated pharmacist, social workers, and our administrative assistant.

The purpose of this rotation is to develop expertise in the care of the critically ill newborn. Expectations vary depending on the specialty and level of each rotator. During this rotation you will learn to recognize neonatal diseases and understand the pathophysiology behind the diseases. You will learn to stabilize and treat ill newborns, recognize when infants require a NICU admission and provide daily care for admitted infants. Secondary objectives of the NICU rotation include time management skills, learning attention to detail and using critical reasoning skills. Key readings have been compiled to help you throughout the rotation and can be accessed within the required readings link at \nmcsd-fs-fild02\dms\NICU). Additionally, you will have a lecture/discussion each afternoon with one of the attending neonatologists on a variety of NICU related topics. All of the NICU policies/procedures can be found within a binder in the NICU or in the sharepoint directory under the DNS (not DMS) link. You will have a pre-test at the beginning of your rotation, as well as a post-test to help track you knowledge of common newborn medical illnesses.

You will assume full responsibility for your patients. This includes completing daily notes, actively participating in patient management and communicating with their families every day. The team also attends all high-risk deliveries. These may include (but are not limited to) all C-sections, as well as vaginal deliveries with the following circumstances: pre-term, meconium, precipitous, forcep/vacuum and deliveries within 1 hour of narcotic administration.

Patient safety is very important. If you are unsure about anything, ALWAYS ask for help. There is a two challenge rule in the NICU. If a question is raised regarding a patient’s plan of care twice, no matter who raises the question, the issue MUST go to an attending for resolution. Always verify medication doses (no matter how frequently they are used). Medications can be verified in the Neofax reference.
NICU Rules

- Always do a 3 minute scrub prior to examining any babies
- No jewelry (watches, rings) below the elbow
- No long sleeve shirts
- Scrubs must NOT be worn into and out of the hospital
- NMCSD ID badge must be worn and visible at all times
- No lab coats may be worn within the NICU
- Covergowns/lab coats must be worn over scrubs when leaving NICU

NICU schedule

Keeping within hours can be difficult, but it is not impossible. You will have an average of one day off per week (4 days off during the 4 week rotation). The daily schedule is made up by Dr. Hoke and the administrative assistant (Pinky), and posted the month prior. Any changes in the schedule must be approved by Dr. Hoke.

Please remind your attending if you’re getting close to exceeding your hours.

TYPICAL DAY:

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>0530-0740</td>
<td>Arrive and pre-round</td>
</tr>
<tr>
<td>0740-0750</td>
<td>Morning report and lecture</td>
</tr>
<tr>
<td>0930-1700</td>
<td>Bedside rounds and teaching, complete work,</td>
</tr>
<tr>
<td></td>
<td>update families</td>
</tr>
<tr>
<td>~1300-1400</td>
<td>Lecture with Gold Team attending</td>
</tr>
<tr>
<td>1700-1800</td>
<td>Sign-out rounds, leave by 1800</td>
</tr>
<tr>
<td>2100</td>
<td>Night rounds if you are on call/nightfloat</td>
</tr>
</tbody>
</table>

Accountability is important. Please alert your NICMO or the NNP if you’re leaving the unit so that all deliveries are covered in your absence. Make sure that the ward clerk/charge nurse has your command cell phone number so that you can be reached if needed.

Please make time EVERYDAY to update the families. This can be accomplished with a phone call or updating at the bedside. The families depend on you and it becomes very obvious if this communication doesn’t occur.

Call / Nightshift

The nursery team will sign out their patients to the on call / nightfloat team. You are required to document any assessment, procedure or intervention on any patient you are called to see. Senior residents on night-shift are required to write on call notes for any changes in clinical
status (such as initiation of sepsis evaluation, NPO status, changes in respiratory support). This can be documented in a “Doctor’s Clinical Note”.

**NICU Mornings - making your life easier**

Here’s what needs to be accomplished each morning to prior to rounds.

****A calculator is required****

*First* – scrub ASAP. It’s easy to forget otherwise. No jewelry below elbows. No long sleeve shirts allowed.

- Talk to the bedside nurse and Nightfloat/NICMO for major overnight issues
- Collect data for notes. Each patient has a folder with rounding sheets and lab review sheets. Keep this up to date for cross coverage.

1. Vitals: click summary grid while under the 5 AM mark for vital ranges
2. A/B/Ds: at bottom of vitals window (with NPASS scores)
3. RT/O2: vent/O2 settings
4. I/O: 24hr totals with summary grid while under 5AM block of the spreadsheet. Check IV, PO (if it was PO or gavage), urine, and stools. Calculate “ins” as total mL/kg/day, calculate urine as mL/kg/hr. Ostomy/NG tube output as total mL/kg/day
   Know what is being fed – formula or breast milk, and kcal/oz
5. Meds: verify with note and orders (watch for self d/c’ing meds like narcotics and antibiotics). You can also review in med flowsheet
6. Labs: most are in Essentris under “Flowsheets - Lab Review” screen, then verify in CHCS (cultures, mailouts and other non-routine labs are not found in Essentris)
   *** pending UCx >24 hrs can be positive! Call the lab for preliminary results
   ***CBC manual differential must be looked at in CHCS

- Check X-rays - CARESTREAM

- Examine babies (make sure you’ve scrubbed!)

  1. Alert nurses that you need to examine the baby. Ask permission – be flexible with care times (especially with feeders-growers).
  2. Exam: key areas heart/lungs/abdomen plus areas for edema
3. Verify drips running
4. Verify vent settings

***If you are having difficulty coordinating care times and exams for your patients talk to your attending and let them know***

5. Check Essentris for overnight orders and new notes from consults.

*** On Mondays review growth charts

**Paperwork**

**NICU History and Physical**

Remember to fill out ALL fields on the Essentris notes. You have to choose “Baby A” at the beginning of the note for maternal information to import. The height/weight/HC and percentiles are most often forgotten. Remember to verify mother’s labs in CHCS, as they can be incorrect in the mother’s H&P.

**Newborn Medical Record**

Infants admitted to the newborn nursery have a NMR history and physical following admission. If an infant is initially admitted to the NICU and it is anticipated that the infant will have a short NICU admission and return to the newborn nursery, a NMR may be completed upon admission. If you are considering this, always discuss it with your attending. Infant’s transferred back to the newborn nursery must have a NMR. If an infant is admitted with a NMR and has a prolonged stay in the NICU, an additional NICU H&P is not needed.

**NICU daily notes**

Collect morning “numbers” (vitals, labs, I/Os). Keep this on your rounding sheet so that you have the information with you for rounds.

The daily note is completed on Essentris. Fill out all of the fields.

Make sure you put thought into your assessment and plan section – this is how you communicate to the staff your thought processes. The attending will review and edit this note on or after rounds.

***make sure that all diagnosis and meds (with per/kg dosing information) are up to date each day***

**NICU Narrative Summaries**

Start these ASAP for all patients. Keep them updated as much as possible. It is important, especially when the baby needs to be transferred emergently or overnight. All narrative summaries must be updated prior to rotating off-
service. This is considered your “off-service” note. Also continue to update the Discharge Checklist in each patient’s rounding folder throughout their admission. All infants discharged from the NICU must have a NICU narrative summary.

**Procedure Notes**

You MUST write a procedure note for EVERY procedure. Templates for these notes are in Essentris.

**Delivery Notes**

All deliveries (with pediatrics in attendance) need a note in the maternal chart. This is a “Newborn Resuscitation” note. This should be done as soon as possible after the delivery. Included in this note should be the reason why you were at the delivery, the infant’s condition, what resuscitation was required, infant’s response to the resuscitation, and plan for further care. Additional information/concerns regarding the infant and plan of care should be incorporated into a new NMR for the patient. Focus on keeping the notes succinct.

**Nursery Calls**

If you’re called, ALWAYS evaluate the baby. Discuss the findings with your senior resident or attending. A new NMR must be started and the note must contain an initial physical exam when evaluating a new nursery patient. If a NMR has already been started on a patient, an “on-call update” note must be added.

**Clinical Notes**

If you are called to evaluate a change in an infant in the NICU, document changes/updates in a “Doctor’s Clinical Note”.

**Consent Forms**

Admission consent forms ideally are obtained prior to delivery, but may be obtained after delivery. Families should be consented for LP, blood product administration, UAC/UVC placement, PICC line placement, and PAL placement. Remember to obtain a witness signature. The witness is to verify the parent’s signature on the form, not the consent process. Always alert families prior to performing any non-emergent procedure, even if the consent is already obtained.

**Orders**

There are **no** verbal orders in the NICU. All orders are written in Essentris. There are standard order sets for NICU Admission > 28 weeks, Admission < 28 weeks, NICU Standard Drips, At risk for sepsis, Sedation for non-emergent intubations, and several other pre-made order sets. ALL
medication orders placed in Essentris must contain the dose/kg in the comments section of the order. Include the patient’s calc weight, total dose and dose/kg. This serves as an additional check between pharmacy and NICU to help prevent medication errors. ALWAYS look up dosing for medications in Neofax… even if it is a commonly used medication!

**NICU EMERGENCY**

****Please review NRP prior to your NICU rotation. *****

The red phones are direct lines from L&D to the NICU.

**Epinephrine dose:** 0.1 to 0.3 ml/kg of 1:10,000 concentration, IV.

APGAR scores:
- Assigned at 1 and 5 minutes
- When 5 minute is less than 7, assign a 10 minute APGAR score
- NOT a good predictor of outcome
- Reflects how the infant is responding to resuscitation

<table>
<thead>
<tr>
<th>SIGN</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Blue or Pale</td>
<td>Acrocyanotic</td>
<td>Completely Pink</td>
</tr>
<tr>
<td>Heart Rate</td>
<td>Absent</td>
<td>&lt;100</td>
<td>&gt;100</td>
</tr>
<tr>
<td>Grimace</td>
<td>No Response</td>
<td>Grimace</td>
<td>Cry/Active</td>
</tr>
<tr>
<td>Muscle Tone</td>
<td>Limp</td>
<td>Some flexion</td>
<td>Active Motion</td>
</tr>
<tr>
<td>Respiratory</td>
<td>Apnea</td>
<td>Weak Cry</td>
<td>Good Cry</td>
</tr>
</tbody>
</table>

***All babies born at less than 36 weeks gestation are admitted to the NICU. Babies who are 35+0 to 35+6 must stay for a minimum of 48 hours in the NICU and an additional 24 hours on the post-partum ward with the mother to be eligible for discharge.***
RESPIRATORY

ETT placement  
Wt (kg) + 6 = cm at the gum line

Uncuffed ETT size -  
Think Weight or Gestational age

<1000 g, <25 wks = 2.5  
1000-2000, 25-30 wks = 3.0  
2000-3000, 30-35 wks = 3.5

Blood Gases:  
pH/pCO2/pO2/base

Blood gases are mostly capillary, though sicker infants have arterial lines. Remember the O2 portion only is useful on arterial gases. Preterm infants are allowed to have permissive hypercapnia. Therefore, their CO2 can run near 60 and pH can be closer to 7.25. This minimizes barotrauma from the ventilators.

Blood gases are to be written on a schedule, but always adjust the schedule based on the clinical status of the infant.

TCOM – Transcutaneous CO2 / O2 monitor can be used to provide information on PaCO2 / PaO2 levels in some infants. They are not always accurate but are helpful to follow trends.

Ventilator:  
Conventional Ventilator:  
Minute Ventilation = Tidal Volume X Respiratory Rate  
To increase ventilation (decrease CO2): increase tidal volume, increase rate  
To increase oxygenation: increase FiO2: increase PEEP
**HFOV:**

To increase ventilation – increase amplitude or decrease Hz (never change the Hz without discussing with the attending first)

To increase oxygentation – increase FiO2 or increase MAP

****A very easy reference for mechanical ventilators can be found on NICU Web – see back page for web link.****

**Oxygen Monitoring**

- The measurement which best assesses an infant’s oxygenation status is the oxygen saturation. The following policy addresses routine saturation goals and routine alarm limits for all NICU patients.
  - In all cases, the desired oxygen saturation ranges and alarm set limits will be entered as orders by the responsible MO or NNP
  - All infants will have the appropriate saturation card mounted on the bedside monitor to ensure compliance with appropriate alarm limits

- Target oxygen saturation and alarm limits for infants receiving supplemental oxygen:
  - **Infants with Gestational Age ≤ 31 6/7 weeks (Blue Card)**
    - Target Saturations: 88-95%
    - Alarm Limits: 87-96% (will not alarm between 88-95%)
  - **Infants with Gestational Age > 32 weeks (Pink Card)**
    - Target Saturations: 90-95%
    - Alarm Limits: 89-96% (will not alarm between 90-95%)
  - **Room Air Card (White Card),**
    - Applies to all infants without any form of supplemental respiratory support regardless of gestational age
    - Target Saturations: > 90%
    - Alarm Limits: Low limit-89% (will not alarm at 90%), High Limit-off
- **Special Category Card (Purple Card)**
  - Applies to special case infants such as cyanotic heart disease, PPHN, etc
  - Target sat limits and alarm limits are blank and are to be filled out by physician or NNP caring for infant

**Caffeine Citrate dose** (used for apnea of prematurity and CLD prevention):
20mg/kg loading dose x1, then 10mg/kg/dose q day (or divided bid)

**Apnea watch** (must complete watch prior to discharge home):
- 10 days off caffeine without any ABD events
- If not on caffeine, infant with a history of ABD events must complete a 5 day apnea watch prior to discharge
- All infants <37 weeks or <2500g must have a carseat test prior to discharge
- Infants with a history of feeding events must complete a 3 day feeding event watch prior to discharge

**Premedication for Non-emergent Intubation**
For routine, non-emergent intubations in the NICU, premedication should be used in almost all cases.

- **Atropine**
  - 0.02mg/kg - Give over 1 minute.

- **Cisatracurium (paralytic)**
  - 0.2mg/kg - Give rapid IV push.
  - As soon as it appears to start having physiologic effects, administer the Fentanyl.

- **Fentanyl**
  - 2mcg/kg - Given IV push
  - Chest wall rigidity will not be an issue if the paralytic has taken effect
<table>
<thead>
<tr>
<th>Weight(kg)</th>
<th>Atropine 0.02mg/kg (0.1mg/ml)**</th>
<th>Cisatracurium (Nimbox) 0.2mg/kg (2mg/ml)</th>
<th>Fentanyl 2mcg/kg 50mcg/ml* 10mcg/ml*</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>0.01 mg 0.1ml</td>
<td>0.1mg 0.05ml</td>
<td>1mcg 0.02ml 0.1ml</td>
</tr>
<tr>
<td>1</td>
<td>0.02mg 0.2ml</td>
<td>0.2mg 0.1ml</td>
<td>2mcg 0.04mg 0.2ml</td>
</tr>
<tr>
<td>1.5</td>
<td>0.03mg 0.3ml</td>
<td>0.3mg 0.15ml</td>
<td>3mcg 0.06mg 0.3ml</td>
</tr>
<tr>
<td>2</td>
<td>0.04mg 0.4ml</td>
<td>0.4mg 0.2ml</td>
<td>4mcg 0.08mg 0.4ml</td>
</tr>
<tr>
<td>2.5</td>
<td>0.05mg 0.5ml</td>
<td>0.5mg 0.25ml</td>
<td>5mcg 0.1ml 0.5ml</td>
</tr>
<tr>
<td>3</td>
<td>0.06mg 0.6ml</td>
<td>0.6mg 0.3ml</td>
<td>6mcg 0.12mg 0.6ml</td>
</tr>
<tr>
<td>3.5</td>
<td>0.07mg 0.7ml</td>
<td>0.7mg 0.35ml</td>
<td>7mcg 0.14mg 0.7ml</td>
</tr>
<tr>
<td>4</td>
<td>0.08mg 0.8ml</td>
<td>0.8mg 0.4ml</td>
<td>8mcg 0.16mg 0.8ml</td>
</tr>
<tr>
<td>4.5</td>
<td>0.09mg 0.9ml</td>
<td>0.9mg 0.45ml</td>
<td>9mcg 0.18mg 0.9ml</td>
</tr>
<tr>
<td>5</td>
<td>NOT TO EXCEED 0.1mg 1ml</td>
<td>1mg 0.5ml</td>
<td>10mcg 0.2ml 1ml</td>
</tr>
</tbody>
</table>

** Ensure you are using this concentration
Revised 10/19/2014

* Dilute 2 ml of 50mcg/ml fentanyl with 8ml NS to get a 10mcg/ml concentration
CARDIOVASCULAR

Hypotension – A guide to approximate “normal” blood pressure in a neonate is to use their gestational age in weeks as a mean arterial blood pressure (MAP). The MAP should be the same or higher than gestational age. However, this number alone should not be used for assessment of hypotension. The infant should also have an elevated heart rate, decreased cap refill and possible metabolic acidosis on a blood gas. Hypotension may respond to NS boluses (10 mL/kg). However if it does not respond, consider medications. First line medication for hypotension is a dopamine gtt. If infant is requiring a dopamine gtt, BP must be followed more closely with arterial access (UAC or PAL).

Signs of a symptomatic PDA: Oxygen requirement, low diastolic BP, palmar pulses, bounding pulses, metabolic acidosis, pansystolic murmur, and respiratory instability

Medical treatment of a symptomatic PDA is with indomethacin – see Neofax for dose. If infant fails treatment with indomethacin and continues to be symptomatic, surgical ligation can be considered.

Lines
   UAC length (cm) = [3 x wt (kg)] + 9 (Goal T7-T9)
   UVC length (cm) = ½ UAC length + 1 (Goal above diaphragm)

**Always prescribe Nystatin 0.5 ml to each cheek q6 when your pt has any central line (UAC, UVC, PICC, Broviac) for fungal prophylaxis

PPHN
Idiopathic/meconium aspiration syndrome
   • Treatment goals – HCT >35, Good systemic blood pressure, decreased shunting
   • Adjunct therapy: iNO (20ppm), consider sedation/paralysis
   • Consider transfer for ECMO for OI >40
   • OI= [FiO2 (%) X MAP] / PaO2
Cyanotic Heart Lesions:

- **Oxy-challenge test** – infants with cyanotic heart lesions have intracardiac right to left shunting, resulting in low PaO2
  - Provide 100% oxygen for 10-20 minutes. Obtain arterial blood gas to assess PaO2.
  - Infants with cyanotic lesions typically cannot achieve a PaO2 of >100mmHg on 100% oxygen
  - Terrible T’s: Truncus Arteriosus, Transposition of the Great Arteries, Tricuspid Atresia, Tetralogy of Fallot, Total Anomalous Pulmonary Venous Return.
HEME

Goal HCT
- >40: severe respiratory distress or congenital heart disease
- >35: intubated or CPAP 5-6, NC if FiO2 is > 35%
- >30: all other respiratory support

Blood transfusions
PRBC transfusions can be common in sick neonates. First and foremost it is our responsibility to minimize and consolidate an infant’s blood draws to help prevent anemia. Prior to any transfusion, obtain consent from family. Typical PRBC transfusion is 10-15ml/kg over 2-4 hours

***If infant receiving PRBC transfusion at <24 hours of age, obtain NBS prior to transfusion***

Neonatal Designated Unit Policy
This policy allows one unit of blood to be used multiple times for one patient within 1 month of initial transfusion, with the goal to decrease donor exposure to the infant. This blood is used only for routine transfusions and CANNOT be used as emergency blood due to the higher potassium levels in older blood.

Ordering blood
Blood used in the NICU is CMV negative or leukocyte depleted, and irradiated. Order volume needed plus 2 ml extra for IV tubing. Manual ordering form completed and given to ward clerk to order from Blood Bank.
NMCSD Protocol for pRBC Transfusion in Stable Premature Infants

Recent studies have suggested a temporal relationship between pRBC transfusion and necrotizing enterocolitis (NEC). This relationship is not shown to be causal, merely related events. One study (Christensen et al, 2010) found that transfusions followed within 48 hours by NEC were particularly evident in infants who were on full volume feeds, particularly with formula rather than breast milk. Accordingly, the neonatology attending at NMCSD have agreed in the absence of conclusive evidence to make premature infants npo around the time of the pRBC transfusion. The following protocol will be followed:

1. When the decision is made to transfuse a patient for a low RBC count, the patient will be made npo.

2. If the patient has no piv access, a piv will be placed. For the next 4 hours, that piv will be used for D10 isoP fluid at an hourly rate calculated to correspond to a total fluid volume of 100-120 mL/kg/day.

3. After 4 hours of npo and piv fluid, that same iv will be used to transfuse pRBCs at a volume of 10-15 mL/kg over 4 hours.

4. After the 4 hour transfusion period, the D10 isoP fluid will be reconnected to the piv site at the same hourly rate used in (2) and run for another 4 hours. During this period, the patient will remain npo.

5. At the conclusion of this third 4 hour period, the piv fluid will be discontinued at feedings can then be restarted according to the new feeding orders. Typically the feedings will start with the same orders previously active before the 12 hour transfusion period.

6. If a stable preemie is not yet on full feeds and has TPN running, clarify with the attending how to run the D10isoP to prevent fluid overload.
BILI
Use the bilirubin curves for 35+ week infants. All infants are checked at 24 hours of life. Any baby born to a mom with blood type O or Rh negative status will have their blood type and Coombs status checked. If the baby is Coombs positive, they will get a 6 hour bili, CBC and retic. Checking these levels is very important on call. If an infant qualifies for phototherapy, please discuss it with the family and write orders. Do not wait for the day team to return. There is less guidance on treatment levels for infants younger than 35 weeks (see Neonatology by T. Gomella).

Hemolytic hyperbilirubinemia – Coombs positive. If rate of rise >0.5/hr or Hct is decreasing, consider IVIG treatment of 500mg-1gram/kg/dose (use order set in Essentris).

Direct hyperbilirubinemia is also a common problem in the NICU with long-term TPN use. It is damaging to the liver and should not be treated with phototherapy. Direct hyperbili can be treated with actigall and fish oil if level is consistently >2 (see policy).

Guidelines for Phototherapy:

- Use total bilirubin. Do not subtract direct reacting or conjugated bilirubin.
- Risk factors = isoimmune hemolytic disease, G6PD deficiency, asphyxia, significant lethargy, temperature instability, sepsis, acidosis, or albumin < 3.0g/dl (if measured)
- For well infants 35-37 6/7 wk can adjust TSB levels for intervention around the medium risk line. It is an option to intervene at lower TSB levels for infants closer to 35 wks and at higher TSB levels for those closer to 37 6/7 wk.
- It is an option to provide conventional phototherapy in hospital or at home at TSB levels 2-3 mg/dL (35-50mmol/L) below those shown but home phototherapy should not be used in any infant with risk factors.
Guidelines for Exchange Transfusion:

Phototherapy guidelines for Healthy Preterm Infants (<35 wks)

<table>
<thead>
<tr>
<th></th>
<th>&lt;1000g</th>
<th>1000-1249g</th>
<th>1250-1499g</th>
<th>1500-1999g</th>
<th>2000-2500g</th>
<th>&gt;2500g</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consider Photo</td>
<td>5mg/dl</td>
<td>5-6 mg/dl</td>
<td>6-7 mg/dl</td>
<td>7-10 mg/dl</td>
<td>10-12 mg/dl</td>
<td>13 mg/dl</td>
</tr>
<tr>
<td>Consider Exchange</td>
<td>10 mg/dl</td>
<td>13 mg/dl</td>
<td>15 mg/dl</td>
<td>17 mg/dl</td>
<td>18 mg/dl</td>
<td>20 mg/dl</td>
</tr>
</tbody>
</table>
Rule out Sepsis Evaluation:
- If infant <24 hol, obtain blood cultures, typically infants get Amp/Gent for minimum of 48 hours
- If infant >24 hol, obtain blood and CSF cultures (consider urine), typically start amp/gent and consider acyclovir.
- Infants with central lines get Vanc/Gent- due to increased risk for S. epidermidis infections

Initiate Sepsis Evaluation for:
1. All Chorio infants
2. Temperature instability (hypothermia; remember to check glucose)
3. Fever (not iatrogenic from warmer), also consider adding Acyclovir.
4. Most infants admitted to NICU -unless delivered early for maternal indication and asymptomatic
5. New onset apnea
6. Distended abdomen with feeding intolerance (consider flagyl if concerned for NEC)
7. Anything else out of the norm in the NICU

HSV evaluation – fever in infant >24 hol
- Obtain CSF and plasma for HSV PCR
  - Both PCRs are sent to Rady’s – however plasma PCR must be ordered as a MISC mail out with “HSV PLASMA PCR to Rady’s” in comments
- Obtain surface cultures for general viral cultures (send to UCSD)
- LFTs
- Start acyclovir, continue until PCR and culture results are negative.

GBS
Adequate treatment - Mother needs ONE dose of penicillin, ampicillin or cefazolin (Ancef) at least 4hrs prior to delivery. Vancomycin and Clindamycin are NOT considered adequate treatment as no data is available regarding the percentage of drug which crosses the placenta, and whether or not this is protective for the infant.
• **SVD & GBS+ Mom**
  o Adequate treatment – no intervention
  o Inadequate treatment - The infant will need screening CBC and blood culture.

• **SVD & GBS Unknown**
  1. **Gestational age >37wks** - Screen for prolonged ROM, maternal fever, maternal or fetal tachycardia. If present, infant needs screening CBC & blood culture
  2. **Gestational age <37wks and mother inadequately treated prior to delivery** - Infant needs screening CBC and blood culture

• **C/Sec & GBS+**
  o Screen mom for contractions, cervical changes, any ROM. If present, infant needs screening CBC and blood culture

• **C/Sec & GBS unknown**
  1. **Gestational age >37wks** - Screen for prolonged ROM, maternal fever, maternal or fetal tachycardia. If present, infant needs CBC and blood culture
  2. **Gestational age <37wks and mother inadequately treated prior to delivery** - Infant needs screening CBC and blood culture
  o **Antibiotics are not immediately started on infants screened for GBS**

**HEP B** (from 2012 Red Book recommendations)

• If mother is Hep BsAg positive: regardless of weight, infant gets HBIG and Hep B immunization within 12 h (and as soon as possible) after birth (in opposite legs).

• If mother is Hep B sAg unknown:
  o Infant >2kg, Hep B imm by 12 hrs, HBIG by 7 days if mother subsequently tests positive.
  o Infant <2kg, Hep B imm by 12 hrs and HBIG by 12 hol if mothers results not available or are positive.

• If mother is Hep B sAg negative:
  o Infant >2kg, Hep B imm at birth
  o Infant <2kg at birth, Hep B imm is given at 30 days or prior to discharge home.
Synagis Candidates:
- 32 to 35+0 plus an additional risk factor (child care, school aged siblings, congenital anomalies, severe neuromuscular disease, birth weight <2500g, multiple gestation, not breastfeeding.)
- All infants born less than 32 weeks
- All infants with significant congenital heart disease

- First dose of 15mg/kg IM at ~30 weeks corrected gestational age.
- Second dose given 4 weeks following, with subsequent doses q month throughout RSV season. Will need consult placed to Synagis clinic.

Other NICU ID items:
- Keep the narrative summary up to date on vaccinations
- Nystatin 0.5ml to each cheek q 6 hours if central line in place
- Aminoglycoside levels should be obtained with the third dose. Patients who receive only 48 hours of antibiotics do not require levels. Levels should not be ordered at start of therapy, only if the decision is made to continue treatment beyond 48h.
FEN

Total Fluids

**Term Day 1** = 60 ml/kg/day of D10W

**Pre-term Day 1** = 60-120 ml/kg/day of D5W-10W

- Consider increasing by 20 ml/kg/day to typical maximum of 150-160 ml/kg/day, depending on the baby.
- Infants who are on TPN have a goal of 130-150 ml/kg/day
- Infants who are on full feeds can increase to 150-160 ml/kg/day
- Total fluid goal is set by the team each day, which can be different then the actual total fluid in. Know both of these numbers and if they are different know why.

Calculated Weight

Weight used to make all fluid and medication calculations. In the first 2 weeks of life, calc wt = birth weight. Once infant is stable and growing well, calc wt is adjusted every few days according to weight gain.

TPN is written on the computer system TPN 2000

- **Key points:** protein/lipid max 3-4 g/day, D12.5 max in peripheral lines, D25 is max in central lines, no calcium in peripheral lines
- **NOTE:** when opening ensure macros security at medium. Password is NMCSD.

Dextrose delivery/Glucose infusion rate can be calculated either way:

\[
\frac{[(\text{rate})(\text{dex\%})(0.167)]}{\text{weight}}
\]

----Or----

\[
\frac{[(\text{ml/kg/day})(\text{dex\%})]}{1.44}
\]

Calcium – Serious IV infiltrate burns can occur when calcium is given through a PIV. Therefore, calcium should only be given through central lines. Only in cases where the infant is symptomatic, or with significant hypocalcaemia (iCa <1), and no central line is available, should calcium be given through a PIV (discuss with Attending). Calcium gluconate at 100-200mg/kg/dose, infused over 30-60 minutes, should be used.
**Individualized Feeding Schedules (IFS)**

All infants <35WGA will be started on an Individualized Feeding Schedule (IFS). All infants >35 receiving NG/OG feeds will also be advanced per an IFS. This will account for the weight of the infant, for the volume of the feedings, and speed of advancement. Slower advancement can be chosen by placing the infant on a “high risk” IFS. Discuss the risk of the infant with the attending and place IFS at bedside prior to starting feeds.

The ability to nipple feed begins around 32-34 weeks corrected. Prior to 32 weeks, infants will need to have NG/OG feeds.

All infants <35WGA should be discharged home on 22kcal/oz transitional formula (Enfacare or Neosure) to provide adequate Calcium/Phos. If breastfeeding, recommend supplementing 2 feeds per day of discharge transitional formula.

All breastfeeding infants should be discharged home with 1ml/day of polyvisol with Iron to ensure adequate Vit D and Iron.

**Residuals**


If evaluation is concerning for NEC-. Consider the following: Place replogle, obtain KUB (second view if concern for perforation), CBC, blood culture, blood gas, lactate level, CRP, surgery consult, consider antibiotics to include anaerobic coverage.

**Wean and Feed Protocol:**

This protocol is used to wean stable babies off of IVFs.

Once an infant has fed twice successfully, the IV fluid may be weaned. AC blood sugars must be obtained prior to the subsequent feedings to determine whether or not the infant can continue to have their IV fluids weaned. For infants with documented hypoglycemia, the level must be above 60, for all other infants, the level must be above 50.

Fluids are weaned by 1ml/kg/hr (when IVF are <D10) when infant has had a normal AC blood glucose level. (For example a 3.2 kg infant will have the IV rate weaned by 3.2 ml/hr if the AC blood glucose level was normal.)

Once the infant is off the IV fluids, 2 normal AC blood glucose levels must be obtained.
Hypoglycemia protocol

*******Dextrose bolus is 2ml/kg of D10*******

Infants at risk for hypoglycemia (see protocol for full list):

- Large for Gestational Age
- Small for Gestational Age
- Preterm <37 weeks
- Maternal Terbutaline
- Maternal Diabetes (on insulin or oral hypoglycemic agents)
- Cold Stress (rectal temp <36.5): One dex at the time of the temp
- Low birth weight (<2500 grams)

The initial hypoglycemia protocol consists of two consecutive AC (before eating) dex’s.

- If both dextrose boluses are >45, the infant is considered to have passed the protocol. No further action needs to be taken unless the infant becomes symptomatic.
- For any dex <25 the infant should be sent to the NICU for immediate care.
- For a dex of 26-44, the infant may be re-fed x1, but must show a trend upward in the glucose level to stay on the floor.

Any infant with a dex <45 at any time

- Must complete the full hypoglycemia protocol.

If any dex is <25 -or- two consecutive dextrose boluses <45 and not increasing

- Infant should be transferred to the NICU for evaluation and/or IV fluid resuscitation.

Infant may transfer back to newborn nursery only after they have completed AC dex x2 and Q6hrs dex x4.
If Dex > 45 then follow protocol

Obtain repeat dex 30-45 min after feed complete

*Dex > 45*

Obtain dex before next two feeds (ac) and every 6 hrs thereafter (also ac)

If still < 45

Dex < 25

Still < 45-call NICU or nursery MO

If > 45 then follow protocol

If fails at any point, restart – if fails more than twice consider discussion with NICU

Infant at risk

Dex ≥ 45

#2 dex ac

Dex ≥ 45

Protocol done

Dex < 45 and > 25

Feed baby*

Dex < 45 and > 25

Dex ≤ 25

Dex < 45 and > 25

Feed baby*

Dex < 45 and > 25

< 45 and > 25 but increasing

Call NICU

Call NICU

Recheck in another 30 min-consider refeeding

Dex ≤ 25

Dex ≤ 25

Call NICU

Call NICU
Humidification in the Giraffe Omnibed for VLBW Infants

- Infants under 1250 grams or below gestational age of 32 weeks may be considered for being in a humidified environment in the Giraffe Omnibed.

- Initial humidity should be set at 60-70%. In the case of infants with extreme prematurity the provider may request that humidity be set for greater than 70%, but there should never be excessive water accumulation on the inside of the bed known as “rain out”.

- After 72 hours, weaning of the humidity should begin. Wean humidity by 5% every 12 hours. This weaning strategy will decrease the humidity to 30% (minimum humidity) by DOL 7. Humidity should not be used longer than 1 week.

- Once the infant is on minimal relative humidity (30%) the humidification may be stopped. The infant can be transferred to a regular incubator if axillary temperatures have been stable.

- Monitor fluid status closely including weight, I&O and electrolytes as well as urine output.
Newborns with Antenatal Hydronephrosis

**This algorithm should not substitute for clinical judgment**

Renal/Bladder Ultrasound during birth hospitalization

- Does the child have one NORMAL kidney?  
- Are the bladder and urethra NORMAL?  
- Was the amniotic fluid level NORMAL?  
- Does the child have NORMAL sized ureters?

"NO"

Call/Consult Urology

"YES"

All "YES"

Normal/Mild HN (SFU Grade 0, 1 or 2)

Follow-up RBUS at 4-8 weeks

Follow-up RBUS at one year of age.

Follow-up as needed

Normal RBUS

Resolved Hydronephrosis

Persistent/New Abnormality

Abnormal RBUS

Outpatient Urology Referral

Moderate HN (SFU Grade 3)

- Start Antimicrobial Prophylaxis
- VCUG at 4-6 weeks -- if no VUR stop antibiotics
- Repeat RBUS at 4-6 weeks

Severe HN (SFU Grade 4)

- Start Antimicrobial Prophylaxis
- VCUG at 2-4 weeks
- Repeat RBUS at 2-4 weeks
- Call/Consult Urology

VUR = Vesicoureteral Reflux  
RBUS = Renal/Bladder Ultrasound  
HN = Hydronephrosis  
VCUG = Voiding Cystourethrogram  
SFU = Society of Fetal Urology

*These children may still be at risk for undetected reflux and should have a VCUG if they develop a UTI
Newborns with Antenatal Hydronephrosis

1 Fetal Renal Pelvis Anteroposterior Diameter Measurements for Hydronephrosis:
   - 2nd Trimester (weeks 14 to 27) > 4 mm
   - 3rd Trimester (week 28 or beyond) > 7 mm
   - OR presence of caliectasis

Abnormal Findings Which Should Prompt Urological Consultation:
   2 - Abnormalities of kidney include solitary kidney, renal mass, malpositioned kidney and/or bilateral abnormalities
   3 - Abnormalities of the bladder/urethra include ureterocele, bladder wall thickening, and/or dilated posterior urethra
   - Abnormalities of the ureter to include megaureter, ectopic ureter, and ureterocele
   - Specific concerns for posterior urethral valves in boys should prompt immediate consultation

4 Choice of Antimicrobial Prophylaxis*:
   - Age ≤ 2 months: Amoxicillin 20 mg/kg daily
   - Age > 2 months: TMP/SMX (dosed by TMP at 2 mg/kg daily) or Nitrofurantoin (2mg/kg daily)
*As appropriate given patient's allergic sensitivities

Additional Notes:
   - If imaging studies are performed at a center other than NMCSD, please ask parents to bring a CD with the images to their urology appointment
   - Please push all radiology images completed at NH Camp Pendleton to the NMCSD PACS System. The NHCP radiology department can help with this.

5 – NMCSD Urology Duty Phone Number: 619-453-6722

References:

Reviewed By:
   Urology: M Christman MD (Pediatric Urology), D Crain MD (Dept Head), D Griffin MD
   Pediatrics: C Welsh MD (Neonatology), J Arnold MD (Dept Head)
   Radiology: RC Camplin MD (Pediatric Radiology)
NEURO

Know the NPASS scores, these assess pain/distress.

Protocol for Cranial Ultrasounds in Premature Infants

Cranial or head ultrasounds (CUS/HUS) is the diagnostic method of choice to detect intraventricular hemorrhage (IVH) and associated ventricular dilation (VD) as well as white matter disease (WMD), which may include hemorrhagic periventricular infarction, cystic periventricular leukomalacia (PVL), subcortical leukomalacia, or basal ganglia lesions. Lesions such as IVH with VD and WMD in VLBW infants are highly predictive of cerebral palsy (CP) at 2 years of age.

Current evidence suggests that infants outside the age range targeted here (i.e., greater than 30 weeks) will have other risk factors for brain injury or symptoms that will eventually warrant CUS prior to discharge.

• Obtained on infants BW <1500g or significantly ill.
• Place infant’s name in US book at front desk for day of desired HUS

<table>
<thead>
<tr>
<th></th>
<th>3-5d</th>
<th>7d</th>
<th>10-14d</th>
<th>28-30d</th>
<th>PTD</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1000g</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>1000-1250g</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>1250-1500g</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

BAERS

Hearing screen MUST be completed on ALL infants prior to discharge home. Hearing screens can be performed when an infant is in an open crib, off antibiotics, and bilirubin issues are resolved. A newborn cannot be discharged from the hospital without a documented hearing test.

Newborn Screen

Obtain after 24 hours of life, or prior to transfusion
Retinopathy of Prematurity (ROP)
Screening exams are performed on infants <31 weeks or <1500 grams. First exam after 4 weeks of age and after 30 weeks corrected. Please put their names in the ROP green book, ASAP after delivery. These infants will need cycloplegic eye drops ordered for the day of the exam. Exam days will vary.

<table>
<thead>
<tr>
<th>Gestational age at birth</th>
<th>Age at initial exam (CGA)</th>
<th>Chronologic age at 1st exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>30</td>
<td>7</td>
</tr>
<tr>
<td>24</td>
<td>30</td>
<td>6</td>
</tr>
<tr>
<td>25</td>
<td>30</td>
<td>5</td>
</tr>
<tr>
<td>26</td>
<td>30</td>
<td>4</td>
</tr>
<tr>
<td>27</td>
<td>31</td>
<td>4</td>
</tr>
<tr>
<td>28</td>
<td>32</td>
<td>4</td>
</tr>
<tr>
<td>29</td>
<td>33</td>
<td>4</td>
</tr>
<tr>
<td>30</td>
<td>34</td>
<td>4</td>
</tr>
</tbody>
</table>

INDOCIN GUIDELINES:
First, all infants <30 weeks should have a cortisol level sent with admission labs. A “high” level is greater than 15.

DO NOT GIVE Indocin:
- If serum cortisol level is > 15 and mother received 2 doses of antenatal steroids
- If infant is > 1250 grams or >30 weeks

GIVE Indocin:
- Neonate <1250g and <30 weeks with incomplete antenatal steroids (less than 2 doses) no matter what the cortisol level is
- Neonate <1250g and <30 weeks and cortisol <15 even if completed antenatal steroid course
Whole Body Cooling for Hypoxic-Ischemic Encephalopathy

- **Infant Eligibility Criteria:**
  - Infants with moderate to severe encephalopathy at the time of presentation should be considered for cooling therapy.
  - The attending neonatologist has final decision. Infant must meet both physiologic and neurologic criteria

- **Physiologic Criteria:** (blood gas is defined as cord blood gas or any blood gas obtained in first hour of life)
  1. Blood gas pH less than 7 or base deficit greater than 16, then proceed to neurologic criteria
  2. No blood gas or blood gas pH 7-7.15 or base deficit of 10-15.9 with an acute perinatal event (abruption, cord prolapse, severe FHR abnormality: variable or late decels), plus either a 10 minute apgar less than 5 or a continued need for ventilation initiated at birth and continue for at least 10 minutes, then proceed to neurologic criteria

**Neurologic Criteria:**

1. Presence of seizures is automatic inclusion
2. Physical examination consistent with moderate to severe encephalopathy in 3 of the 6 categories below:
### Table: Encephalopathy States

<table>
<thead>
<tr>
<th>Category</th>
<th>Moderate Encephalopathy</th>
<th>Severe Encephalopathy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level of Consciousness</strong></td>
<td>Lethargic</td>
<td>Stupor/Coma</td>
</tr>
<tr>
<td><strong>Spontaneous Movement</strong></td>
<td>Decreased</td>
<td>No activity</td>
</tr>
<tr>
<td><strong>Posture</strong></td>
<td>Distal flexion</td>
<td>Decerebrate</td>
</tr>
<tr>
<td><strong>Tone</strong></td>
<td>Hypotonic</td>
<td>Flaccid</td>
</tr>
<tr>
<td><strong>Primitive Reflexes:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suck</td>
<td>Weak</td>
<td>Absent</td>
</tr>
<tr>
<td>Moro</td>
<td>Incomplete</td>
<td>Absent</td>
</tr>
<tr>
<td><strong>Autonomic System:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pupils</td>
<td>Constricted</td>
<td>Dilated, Non-reactive</td>
</tr>
<tr>
<td>Heart Rate</td>
<td>Bradycardia</td>
<td>Variable</td>
</tr>
<tr>
<td>Respiration</td>
<td>Periodic Breathing</td>
<td>Apnea</td>
</tr>
</tbody>
</table>

- **Exclusion Criteria**
  1. Gestational age less than 35 weeks
  2. Birth weight less than 1800 grams
  3. Unable to initiate cooling within 6 hours

---
Neonatal Abstinence Syndrome

• Any infant with suspected exposure to drugs of abuse during fetal life should have urine and meconium sent for drug testing. In any case of an infant testing positive for drugs of abuse or when there is a strong suspicion based on maternal history, a CPS referral should be made.

• All newborns deemed at risk for Neonatal Abstinence Syndrome (NAS) require abstinence scoring. If asymptomatic, they may reside with their mothers in the MIU. Any Finnegan Score >7 requires admission to the NICU.

• Infants with intrauterine exposure to methadone should be monitored in house for a minimum of 7 days. Those exposed to shorter acting opiates should be monitored in house for a minimum of 3 days
  1. Any neonate requiring 2 or more days of continuous opiate drips or prolonged, round the clock bolus opiate treatment, should have abstinence scoring
  2. Abstinence scores using the Finnegan Score should be completed with each set of vitals.
     o Scoring should be conducted Q 4 hours if asymptomatic and residing in the MIU
     o Scoring should be conducted Q 3 hours if admitted to the NICU
  3. Two scores of eight or higher indicate withdrawal

• Stabilization of Acute Withdrawal
  1. Acute withdrawal seizures can be treated with 0.1-0.2 mg/kg of IV Morphine

  2. Infants who are unable to take PO medication should be stabilized on a fentanyl drip
     • Starting dose should be 1 microgram/kg/hour
     • Dose may be titrated up in 0.5 microgram/kg/hr increments until withdrawal has stabilized

  3. Infants able to take PO meds should be stabilized on oral morphine
     • Starting dose should be 0.04 mg/kg/dose Q 3 hours
     • Dose may be titrated up in 0.02 mg/kg/dose increments until withdrawal has stabilized
4. Infants with iatrogenic opiate dependence should be returned to the last dosing regimen prior to onset of withdrawal symptoms

5. Stabilization of withdrawal will be deemed successful when abstinence scores are consistently < 8 for twenty-four hours

- **Weaning Phase**

1. When abstinence scores are < 8 for 24 hours, begin weaning

2. Weaning should initially be done by increments of 10% of the total stabilizing dose

3. Doses may be weaned twice per day if tolerated
   - The physician or NNP must write each new dose in the orders. Automated weaning orders are not acceptable
   - Expect the pace of weaning to slow as the dose lowers

4. Infants on fentanyl drips who are now able to take PO medication may be switched to an equivalent dose of PO morphine
   - Have pharmacy calculate the total fentanyl dose for a 24-hour period. Convert it to an equivalent PO morphine dose for the same 24-hour period and then divide the full days dose over Q 3 hour dosing
   - Wait 12 hours before resuming wean
<table>
<thead>
<tr>
<th>SYSTEMS</th>
<th>SIGNS AND SYMPTOMS</th>
<th>SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CENTRAL NERVOUS SYSTEM</td>
<td>High Pitched Cry</td>
<td>2</td>
</tr>
<tr>
<td>DISTURBANCES</td>
<td>Continuous High Pitched Cry</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Sleeps &lt; 1 Hour After Feeding</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Sleeps &lt; 2 Hours After Feeding</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Hyperactive Moro Reflex</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Markedly Hyperactive Moro Reflex</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Mild Tremors Disturbed</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Moderate Severe Tremors Disturbed</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Mild Tremors Undisturbed</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Moderate Severe Tremors Undisturbed</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Increased Muscle Tone</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Excoriation (specify area): __________________________</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Myoclonic Jerks</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Generalized Convulsions</td>
<td>3</td>
</tr>
<tr>
<td>METABOLIC VASOMOTOR/</td>
<td>Sweating</td>
<td>1</td>
</tr>
<tr>
<td>RESPIRATORY DISTURBANCES</td>
<td>Fever &lt; 101°F (39.3°C)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Fever &gt; 101°F (39.3°C)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Frequent Yawning (&gt; 3-4 times/interval)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Mottling</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Nasal Stuffiness</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Sneezing (&gt; 3-4 times/interval)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Nasal Flaring</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Respiratory Rate &gt; 60/min</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Respiration Rate &gt; 60/min with Retractions</td>
<td>2</td>
</tr>
<tr>
<td>GASTROINTESTINAL</td>
<td>Excessive Sucking</td>
<td>1</td>
</tr>
<tr>
<td>DISTURBANCES</td>
<td>Poor Feeding</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Regurgitation</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Projectile Vomiting</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Loose Stools</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Watery Stools</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>TOTAL SCORE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SCORER'S INITIALS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>STATUS OF THERAPY</td>
<td></td>
</tr>
</tbody>
</table>
OTHER

Resuscitation of Tiny Infants

- Infants 24 weeks and above will be resuscitated
- Infants 23+0 to 23+6 – discuss with family and comply with the family’s wishes for resuscitation.
- No resuscitation provided for < 22+6

Discharge Planning

In anticipation of discharge:

It is your responsibility to update the Narrative Summary weekly. Order discharge medications in CHCS so that they are available for family teaching. Make arrangements for circumcision (consent obtained, call to nursery for procedure). Offer the family the opportunity to room in. Room in is offered to all families but is only required when they are being discharged with durable medical equipment. All EFMP paperwork must be completed prior to discharge and follow-up physician identified.

At time of discharge:

Complete Narrative Summary and have attending sign it. Ensure discharge height, weight and head circumference is in narrative summary. Complete standard discharge orders in Essentris. Follow up visit scheduled 1-3 days following discharge (discuss with NICU social worker) and determine if infant needs to be seen in NICU Grad clinic. Document any consult follow up needs (Synagis clinic, High Risk Developmental followup clinic, subspecialty clinic, etc). ROP follow-up will be scheduled by the NICU administrative assistant (directions for scheduling can be found in NICU ROP book). Appointments are generally on Mondays on 2N location. Family should receive a copy of the narrative summary.
Treatment of Extravasation Injury with hyaluronidase (IV Infiltrate)
Hyaluronidase is used to prevent tissue damage as a result of infiltration of hyperosmotic fluids into the interstitial space. It is a mucolytic enzyme that breaks down intercellular barriers allowing for rapid dispersal of the fluid. It should not be used for the treatment of infiltrate by vasoconstrictive agents (dopamine, epinephrine etc).

<table>
<thead>
<tr>
<th>Drug</th>
<th>concentration</th>
<th>dilution</th>
<th>Final concentration</th>
<th>Dose (each injection along infiltrate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wydase</td>
<td>150 units/ml</td>
<td>0.1ml wydase in 0.9ml NS</td>
<td>15 units/ml</td>
<td>0.2 ml</td>
</tr>
<tr>
<td>Vitrase</td>
<td>200 units/ml</td>
<td>0.15 ml Vitrase in 1.85 ml NS</td>
<td>15 units/ml</td>
<td>0.2 ml</td>
</tr>
</tbody>
</table>
**NICU Web Resources**

**Neonatology on the Web** (good general resource for physicians and family handouts)
http://www.neonatology.org/

**TOXNET/LactMed** – for breastfeeding and mother’s medication

**Red Book**

**Radiology Cases in Neonatology**
http://www.hawaii.edu/medicine/pediatrics/neoxray/neoxray.html

**Online Mendelian Inheritance in Man**

**PubMed**

**Up To Date**
http://www.uptodate.com/

**National Organization of Rare Disorders**
http://www.rarediseases.org/

**NICU Web** - **great handout for ventilator management**
http://depts.washington.edu/nicuweb/

**Journal Club for Neonatologists (Florida)**
http://www.fsneo.org/JourClub/

**Bilirubin charts**
www.bilitool.org