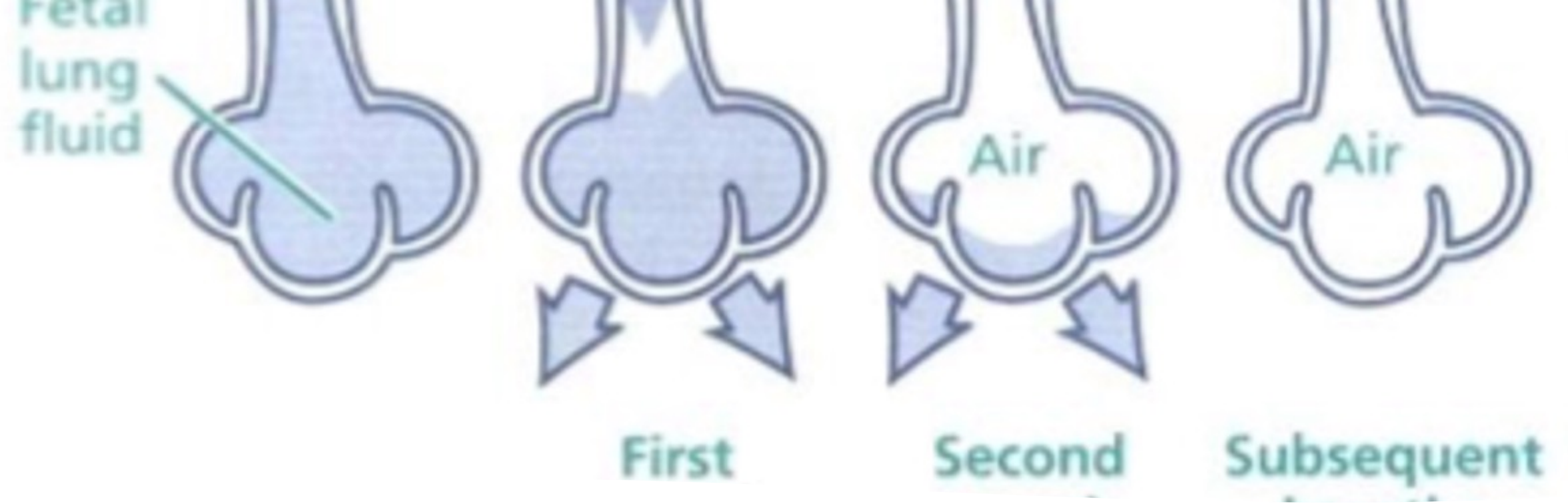
Newborn



Transition—Pulmonary

With the onset of labor the fluid begins to clear from the lungs

- Epi and vasopressin lead to decreased fluid secretion
- Plasma proteins increase with labor, shifting the oncotic pressure. This leads to reabsorption of the fluid into the cardiovascular system
- Fetal breathing prepares the lungs and respiratory muscles

Extrauterine life

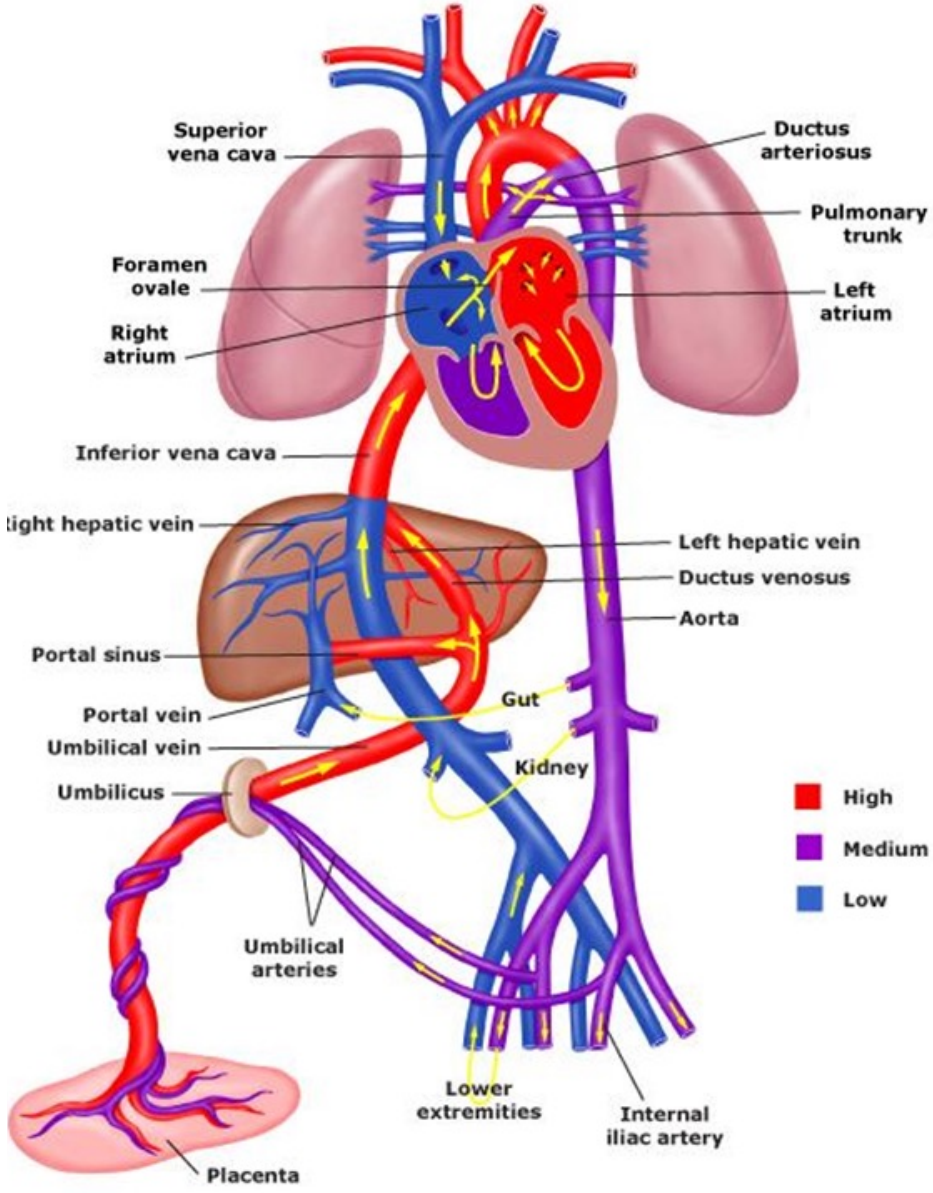
- Warm/dry stim works to stimulate breathing
- Surfactant begins to coat alveoli to keep lungs expanded—this takes time

Transition—Cardiac

Oxygenated blood enters fetal circulation via the umbilical vein

- **Ductus venosus**: Allows oxygenated blood from the placenta to bypass the liver
- **Foramen Ovale**: Allows blood to enter the left atrium from the right atrium. “Right to left shunt”
- **Ductus Arteriosus**: Allows most of the blood from the right ventricle to bypass the non-functioning lungs

Low-oxygenated blood leaves the fetal circulation via the umbilical arteries



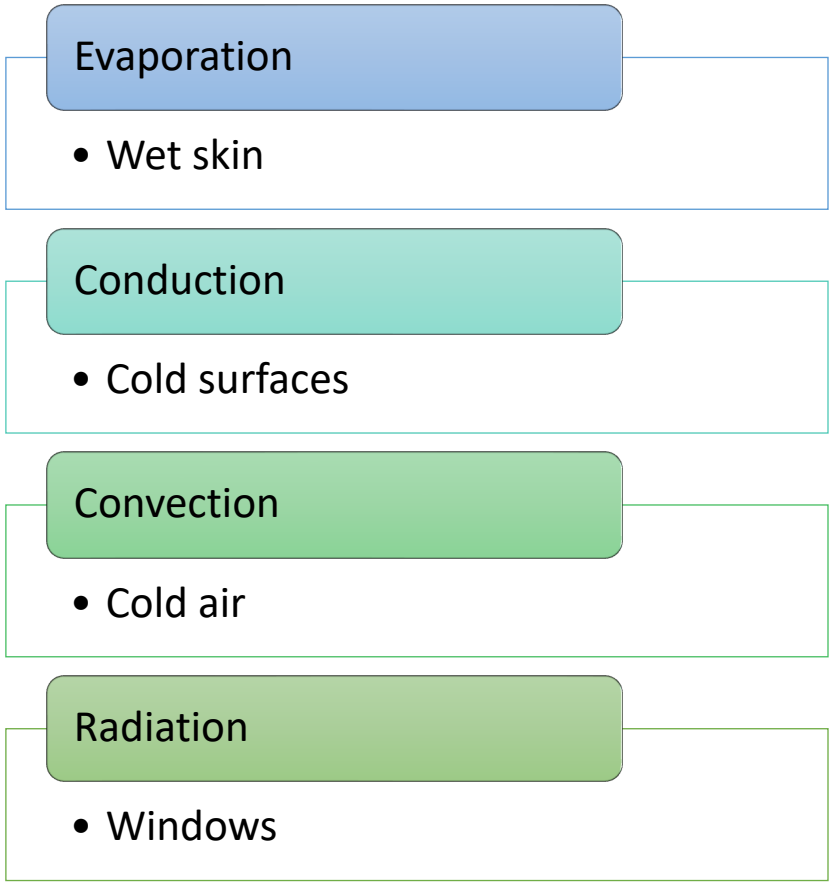
Transition—Thermoregulation

Goal: Neutral Thermal Environment

- Balance heat production with heat loss

Potential further problems:

- Cold stress increases oxygen and glucose consumption, leading to hypoglycemia and acidosis
- Acidosis, in turn, contributes to the potential for persistent pulmonary hypertension of the newborn (more on PPHN later)



Transition—Hypoglycemia

Glucose crosses the placenta→Baby
Baby's status depends on maternal levels, gestational age at birth, and the status of the newborn.

Increased Utilization	Needing to maintain their own temperature, increased work of breathing (WOB), feeds, etc. The sicker the newborn, the quicker they will utilize their available glucose.
Decreased Stores	Those newborns born before term, IUGR or SGA are at higher risk for hypoglycemia due to their inability to effectively store glycogen before birth.
Hyper-Insulinemia	While in utero IDM or LGA newborns are at risk for being exposed to high levels of glucose from the pregnant person. These newborns produce high levels of insulin because of this. Once this source of glucose is cut off after birth, the high insulin levels utilize their glucose quickly putting them at risk for hypoglycemia.

Hypoglycemia, cont’d

- High risk infants (IDM, LPT, LGA/SGA) screen 30-60 minutes after birth (after first ch/bfeed session)
  - Goal: 45mg/dL
- Symptoms are largely CNS
  - Irritable, jittery, hypothermic, seizure
- Treatment
  - Glucose Gel
  - Ch/Bfeed and supplementation
  - IVF
- There is no consensus on when hypoglycemia impacts the newborn.

The Quick Assessment

VS/Distress

Normal

- **RR 30-60bpm**
- No ↑ WOB
- BS clear and equal
- **HR 120-160bpm**
- RRR
- Equal pulses
- CRT<3 sec
- **Temp 36.5-37.5**

Normal Deviation

- **RR**
- TTN
- Variability with state

- **HR**
- Low resting HR (80 BPM)

Abnormal Variation

- **RR**
- Grunting, gasping
- Retractions, nasal flaring
- **HR**
- Murmurs, gallops, clicks
- CRT >3sec
- Cyanosis
- **Temp <36.5, >37.5**

Signs and Symptoms of Birth Trauma

Normal

- **Free of birth trauma**

Normal Deviation

- **Molding**

Abnormal Variation

- **Pale**
- **Lesions (scalp electrodes, HSV/syphilis)**
- **Bruising**
- **Redness/Ruddy**
- **Cyanosis**

Congenital Malformations

Normal

- **Free of any deviations that represent malformation, deformation, or disruption of normal development**

Normal Deviation

- **Minor**
- Cosmetic
- Skin tags
- Ear pits
- Accessory digit
- Supernumery nipple
- Molding
- Breech

Abnormal Variation

- **Major**
- Cleft lip/palate
- Myelomeningocele
- Hip dislocation
- Cardiac
- Asymmetry
- Pierre Robin
- Trisomy 21

The Full Assessment

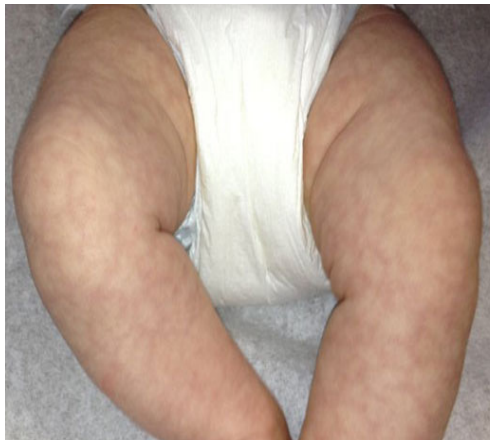
Skin

Normal

- Pink
- Warm
- Intact
- Dry
- Smooth
- Acrocyanosis*

Normal Deviation

- Erythema Toxicum
- Milia
- Vernix
- Lanugo
- Brief mottling
- Peeling or intermittent moisture
- Birthmarks
- Dermal melanocytosis



Skin: Abnormal Variations

- **Jaundice within 24 hours or severe**
- **Pale**
- **Lesions (scalp electrodes, HSV/syphilis)**
- **Bruising/ Petechiae**
- **Redness/Ruddy**
- **Cyanosis**
- **Hemangiomas**

HEENT

Normal

- **Head**
- Round
- Soft Fontanelle
- Approximated Sutures
- **Eyes**
- Symmetric
- Free of discharge
- PERRL
- **Ears**
- Top of ear in line with outer canthus
- Recoil
- **Nose**
- Patent

Normal Deviation

- **Head**
- Molding
- Caput
- Cephalo-hematoma
- **Eyes**
- Wide set
- **Ears**
- Misaligned ears
- Skin Tags
- **Nose**
- Drainage
- **Mouth**
- Ankyloglossia
- Natal teeth
- Epstein pearls

Abnormal Variation

- **Head**
- Subgaleal hemorrhage
- **Eyes**
- Discharge
- Nystagmus
- **Nose**
- Occluded
- **Mouth**
- Cleft Lip/Palate
- Lesions

Chest/Abdomen

Normal

- **Chest**
- Symmetric
- Nipples near mid-clavicular line
- **Abdomen**
- Symmetric
- Soft, rounded
- **Umbilical cord**
- 2 arteries and 1 vein
- Clean and dry

Normal Deviation

- **Chest**
- Small breast buds
- Supernumery nipple
- Pectus excavatum
- **Abdomen**
- Flat
- Full

Abnormal Variation

- **Chest**
- Increased WOB
- Barrel/cylinder chested
- **Abdomen**
- Distended/scaphoid
- Tense
- Bluish
- **Umbilical Cord**
- Redness
- 2 vessel (can be normal)

Genitourinary/Anus

Normal

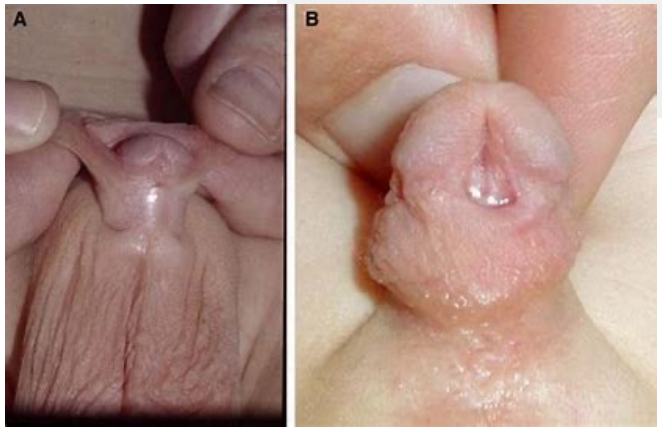
- **Female**
- Patent vagina
- **Male**
- Descended testicles
- **Anus**
- Patent with sphincter response
- **Voiding**
- **Stooling (within 24-48hrs)**

Normal Deviation

- **Female**
- Skin tags
- Edema (at birth)
- Discharge white

Abnormal Variation

- **Male**
- Hydrocele
- Hernias
- Hypospadias
- Undescended testicles
- Testicular torsion
- **Anus**
- Imperforate Anus
- Anal fissure



Musculoskeletal

Normal

- **Extremities**
- 10 fingers
- 10 toes
- Symmetric
- ROM
- Creases in hands
- **Spine/Back**
- Straight

Normal Deviation

- **None**

Abnormal Variation

- **Extremities**
- Extra digits
- Deformities
- Abnormal ROM
- **Spine/Back**
- Curved
- Dimple
- Tuft of hair
- Lesion
- Open spinal defect

Neuro

Normal

- **Smooth and symmetric movements**
- **Strong Cry**
- **Reflexes:**
- Suck/gag/root
- Grasp
- Moro
- **LOC/State**
- **Moderate flexion**

Normal Deviation

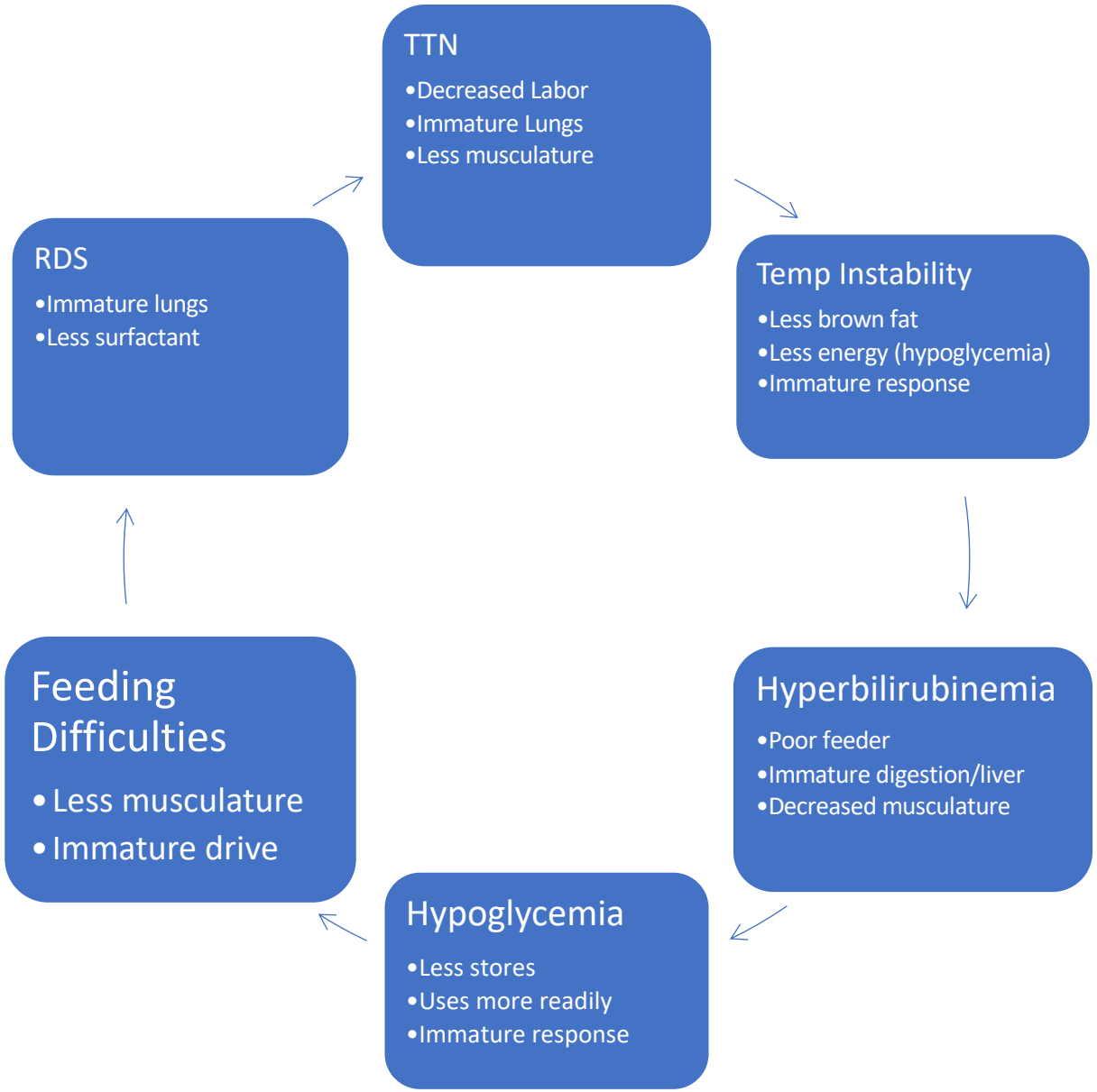
- **Transient jitteriness**

Abnormal Variation

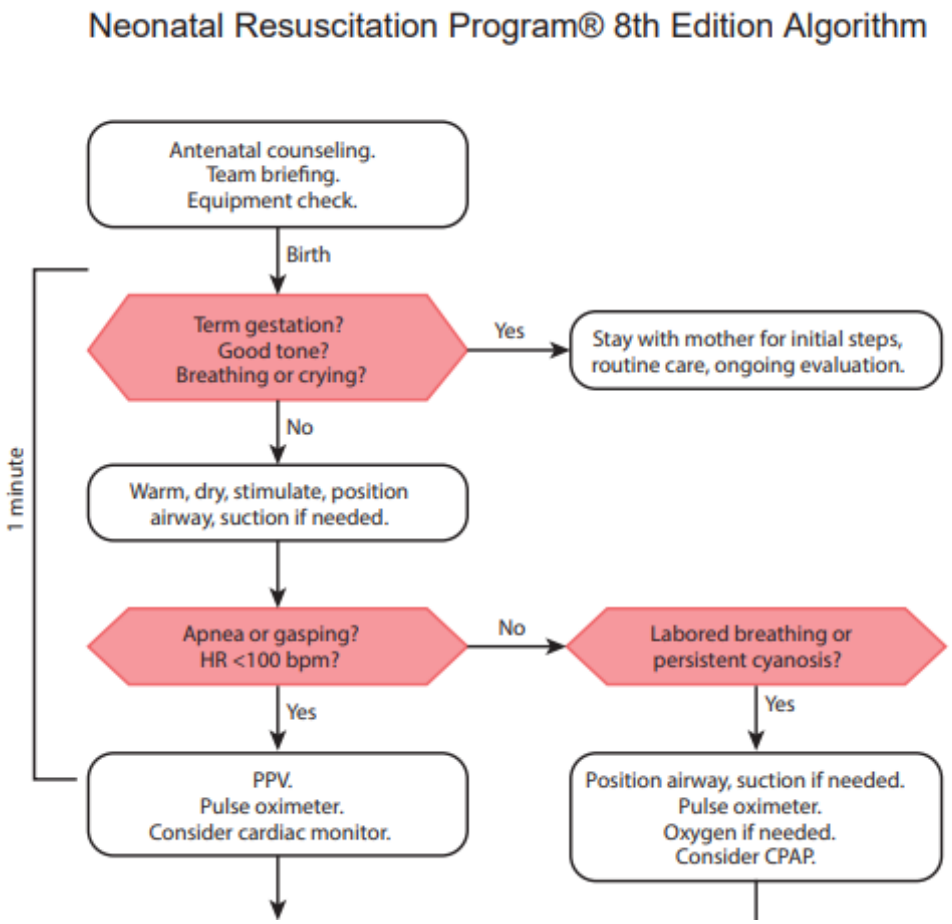
- **Weak/absent reflexes**
- **Weak/shrill cry**
- **Lethargy/irritability**
- **Hypotonia/hypertonia**
- **Decreased or absent reflexes**
- **Seizures**
- Know the s/sx!

Late Preterm

35-38 weeks GA
The great pretenders



Resuscitation



- 4 Pre-Birth Questions
  - Gestational Age
  - Fluid Status/color
  - Delayed Cord Clamping Plan
  - Risk Factors
- 3 Birth Questions
  - Term?
  - Good Tone?
  - Breathing/Crying?

Emergent Congenital Birth Defects

- Diaphragmatic Hernia
  - Diaphragm does not close, allowing stomach/bowel/liver to enter chest cavity
  - Assessment: Scaphoid abdomen, barrel chest
  - Surgical Emergency: No CPAP, NPO, and gastric decompression
- Tracheoesophageal Fistula
  - Fistula occurs between trachea and esophagus. May include a tracheal or esophageal blind pouching
  - Assessment: poor feeder, cough, “spitty”
  - NPO and gastric decompression
- Choanal Atresia
  - Either one or both nares with atresia or stenosis
  - Assessment: “Pink” when crying; “Blue” at rest

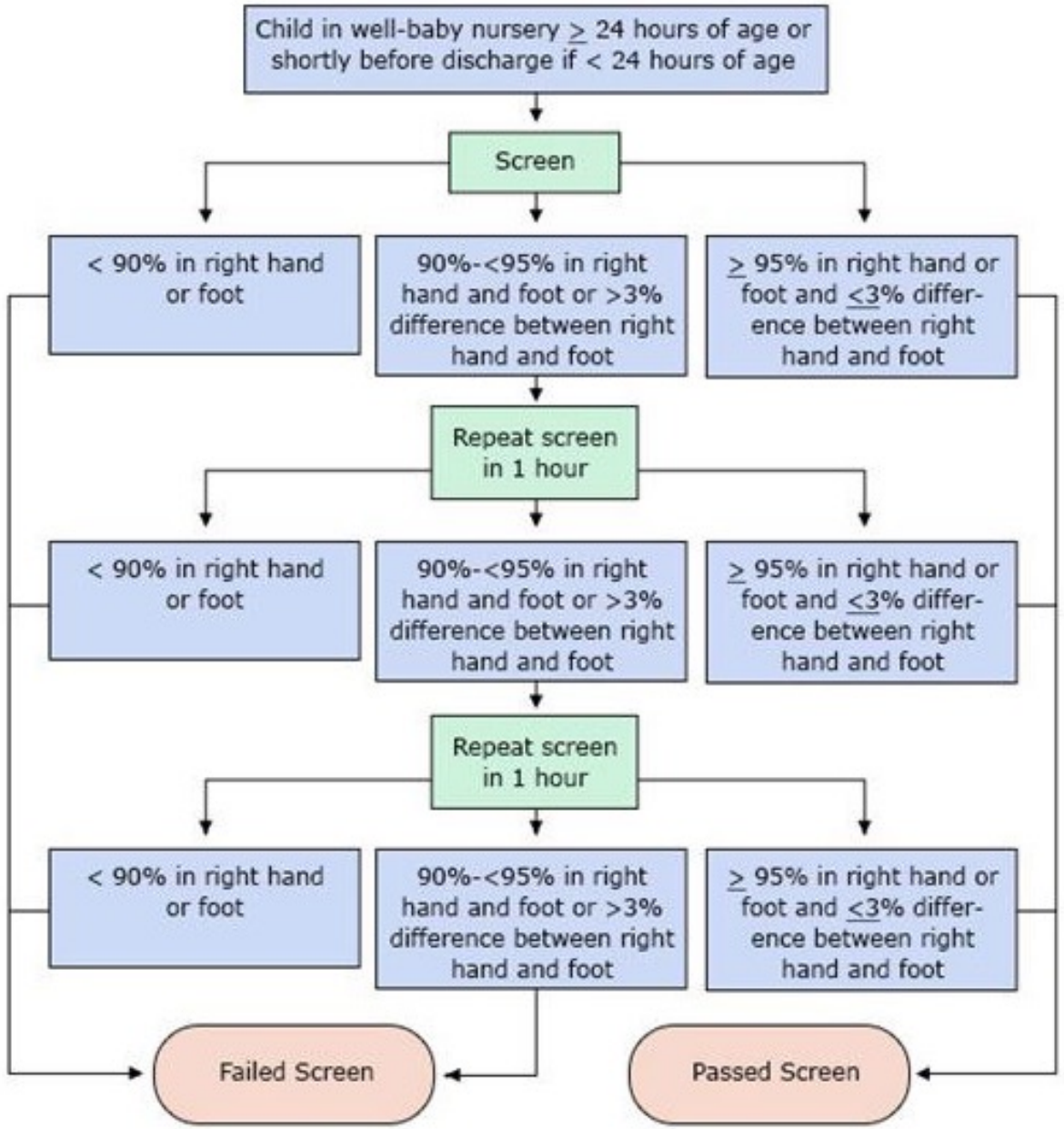
Congenital Cardiac Heart Defect

CCHD Screening

- Detects the most common birth defects that are associated with hypoxia
  - Hypoplastic left heart syndrome
  - Pulmonary atresia
  - Tetralogy of Fallot
  - Transposition of the great arteries

CCHD Cont'd

- Pulse ox placement:
  - R Hand
  - Either foot

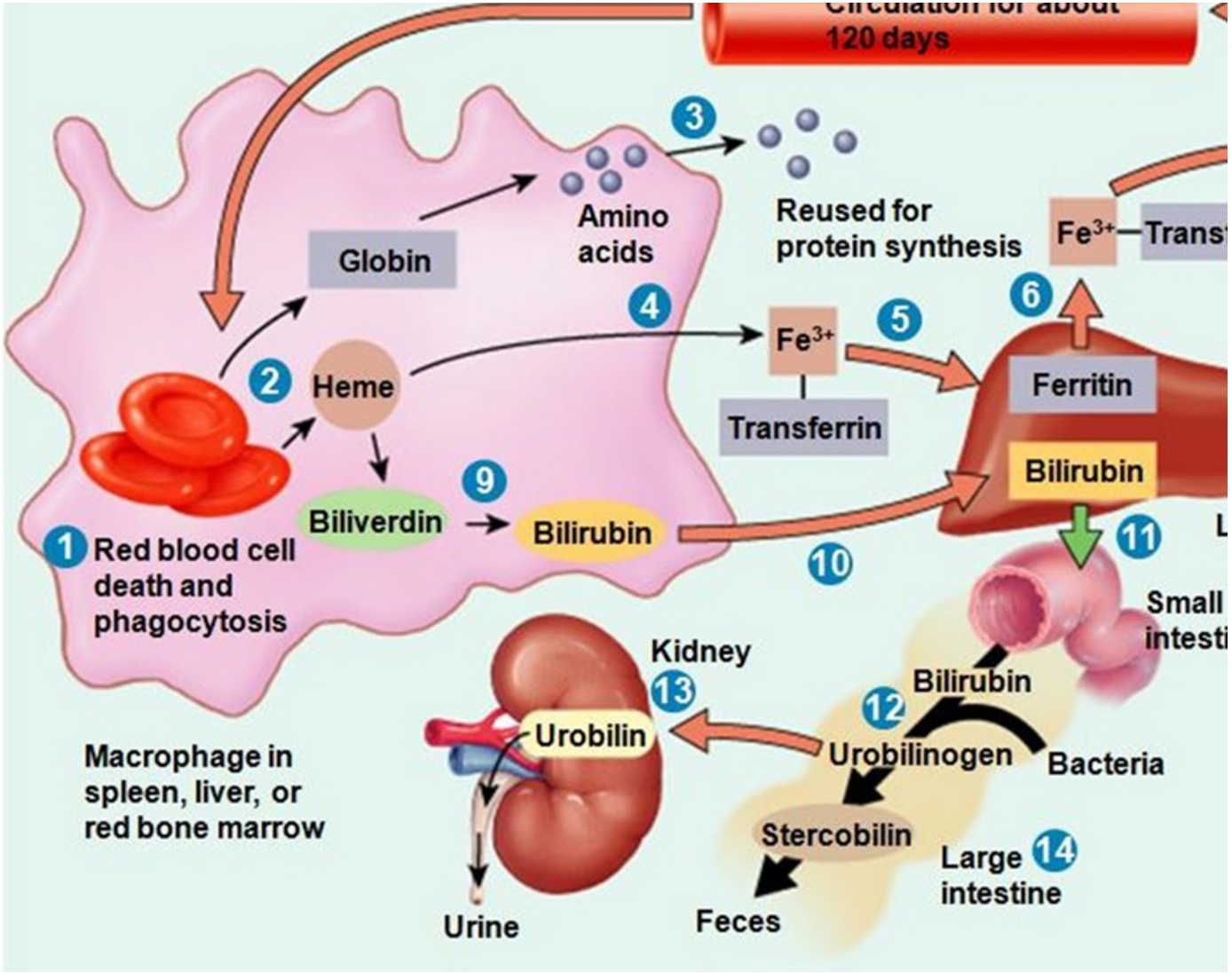


Jaundice

Hyperbilirubinemia

Physiology

- Bilirubin is the end product of Heme degradation
- Produce bili at a rate of almost twice that of adults
  - Increased RBC volume
  - Shorter RBC lifespan
  - Hemolysis
  - Limited liver enzymes
- Worsening symptoms/risk of toxicity with infection, liver issues, hemolytic disease
- Decreased excretion of bile



Jaundice

- Jaundice
  - progresses face to feet
- Sleepy/lethargy
- Poor feeding
- Hypotonia
- Arching of the head, neck and back (opisthotonos)
- Seizures

Phototherapy: TCB and TSB

BiliTool™

- All infants get measured 24-36 hours, within 24 hours of discharge
  - Measure on forehead or sternum
    - Avoid bruises, hair, birthmarks
  - Plot on tool→Age specific
  - High Intermediate vs. High Risk
    - Send TSB
- Any jaundice within 24 hours perform TCB
  - High intermediate vs. High risk
    - Send TSB, HCT, Coombs, type and screen

Hyperbilirubinemia Neurotoxicity Risk Factors

- Gestational age < 38 weeks. This risk increases with the degree of prematurity*
- Albumin < 3.0 g/dL
- Isoimmune hemolytic disease (ie, positive direct antiglobulin test), G6PD deficiency, or other hemolytic conditions
- Sepsis
- Significant clinical instability in the previous 24 hours

*Gestational age is required to identify the phototherapy thresholds and the exchange transfusion thresholds.

- Breastfeeding support********
  - Supplemental feedings may not be needed
  - IV therapy rarely needed unless very dehydrated
- Phototherapy- ASAP and high intensity
  - Blue light changes bilirubin so it can be excreted
  - Intensive= 30 microwatts/cm2/nm
- In the NICU
  - IVIG for ABO to slow hemolysis
  - Exchange transfusion- ASAP

Acute Bilirubin Encephalopathy→Kernicterus

Clinical Features

- Early phase
  - lethargy, poor suck, hypotonia
- Intermediate phase*
  - stupor, irritability, hypertonia
- Advanced phase (irreversible)
  - pronounced retrocollis-opisthotonos, shrill cry, fever, apnea, coma, seizures, death

- Levels high or rising rapidly could cause kernicterus
  - Brain cells stained yellow
  - CP, eye paralysis
  - Hearing loss
  - Preventable problem- should be

    A NEVER EVENT!

- *Exchange transfusion/intensive phototherapy has been shown to reverse at least some of the CNS changes

Labs

Labs

- HCT
  - 48-60%
  - Peaks at 2 hours
  - Decreases by 24 hours
- WBC
  - 9-30
  - Neutropenia→infection

- ABO Incompatibility
  - Type O gestational carrier
  - Type A or Type B Fetus
  - Gestational carrier makes antibodies against A or B
    - **Coombs positive**
  - Antibodies cross to fetus and destroy RBCs (think: Jaundice)

Lactation

Physiology

- Chest/Breastfeeding stimulates prolactin and oxytocin release
  - Prolactin levels increase and is released from the anterior pituitary
  - Estrogen and progesterone decrease
- Birthing person needs 300-500 more calories and adequate fluid intake

Techniques and Holds

- LATCH
  - **L**atch
  - **A**udible swallowing
  - **T**ype of nipple
  - **C**omfort of mother
  - **H**old

Contraindications and Complications

- Contraindications
  - HIV
  - Illicit drug use (e.g. heroin)
  - Active TB
  - Chemotherapy
  - Antiretrovirals
- Complications
  - **Anxiety**
  - Pain
    - r/t poor latch
  - Engorgement
    - Subsides in approx. 3 days if formula feeding
  - Plugged ducks

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