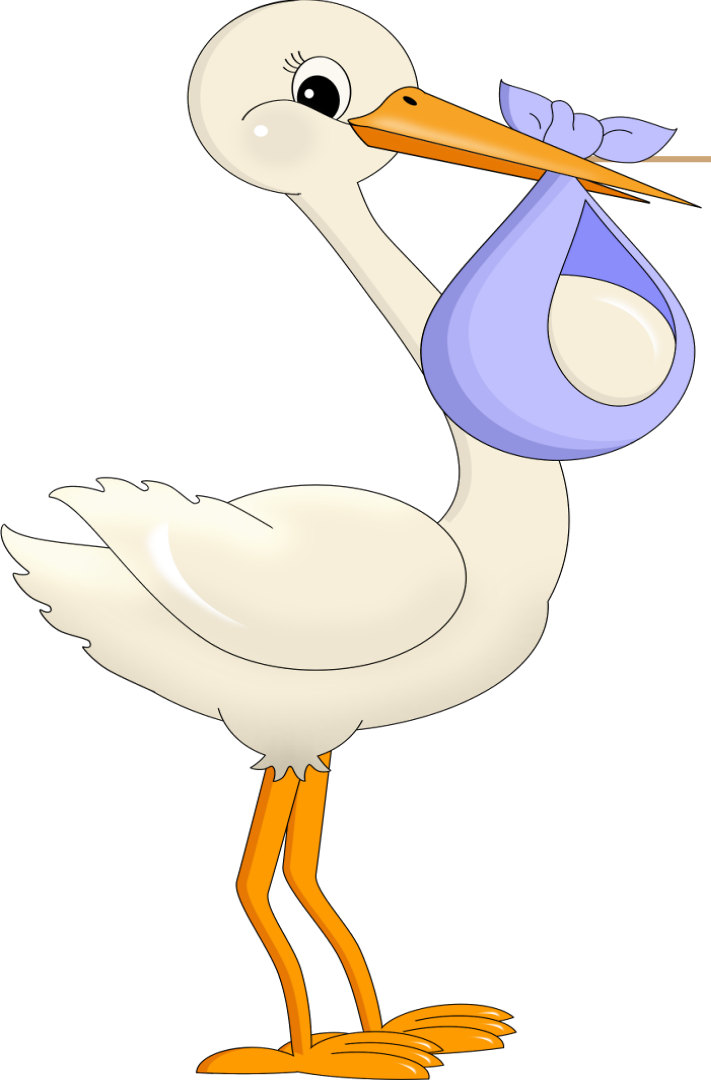

Well Newborn

Teaching

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Disclosures

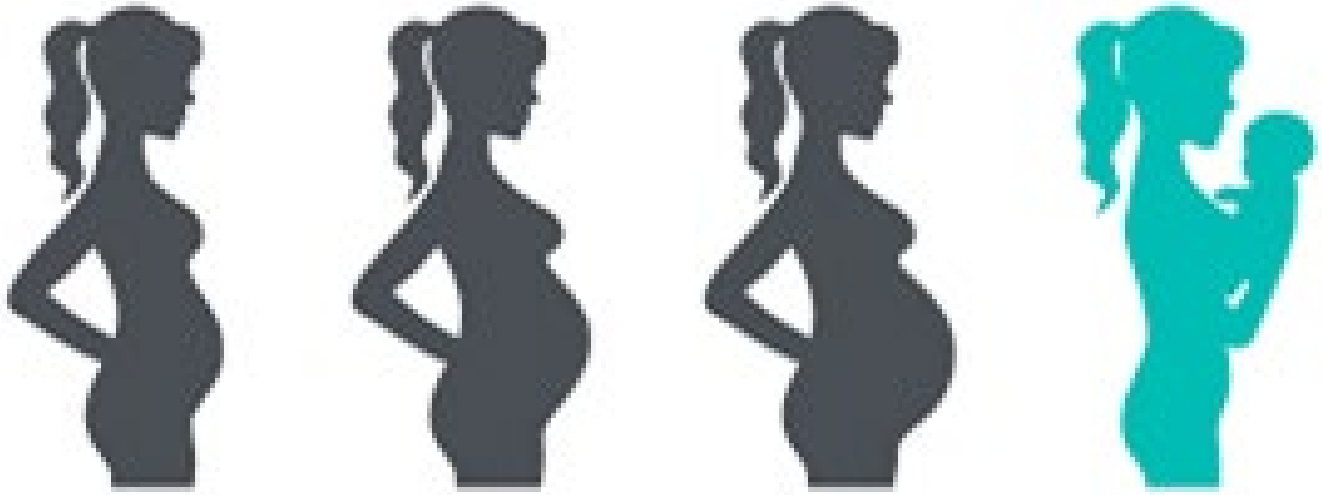
- None

Learning Objectives

- Describe the general approach to the neonatal examination
- Outline the components of an adequate antenatal and neonatal history
- Explore common abnormal neonatal findings on physical examination
- Briefly outline the approach to hyperbilirubinaemia , Hypoglycaemia, and Neonatal sepsis
- Describe the elements of parental anticipatory guidance as a component of the well baby check
- Recognise red flags on neonatal history and physical examination requiring paediatric referral

History

- Pregnancy
- Labour
- Delivery
- Neonatal status
- Family Hx
- Social Hx

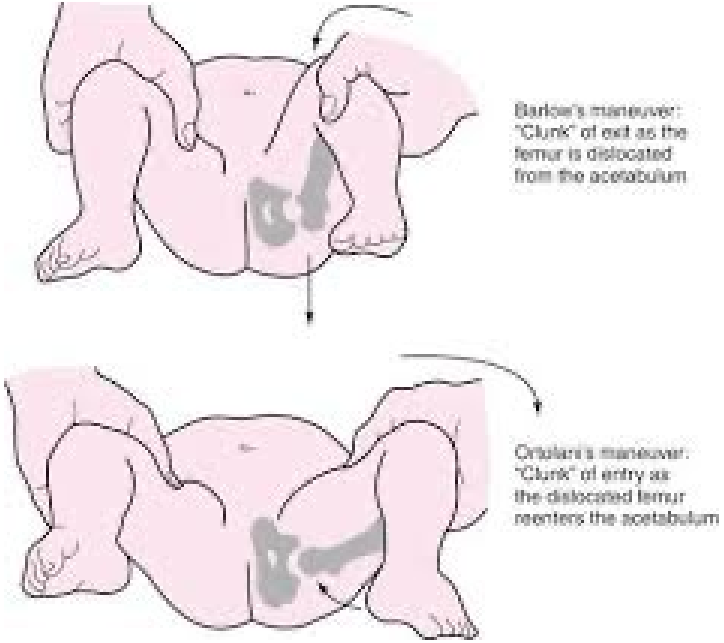


Physical Exam

- General: growth parameters, tone, colour, distress, GA
- Head/Neck: dysmorphisms, fontanelles, scalp, red reflexes, lips/palate
- Chest: murmurs, crackles
- Abdo: masses, HSM, scaphoid
- GU: testes, urethral position, anus
- Limbs: symmetrical movement
- Spine: dimples
- MSK: Hips
    - Barlow - ADD hip and posterior pressure
    - Ortolani - AB hip, anterior pressure
- Neuro: Suck, Moro, Rooting
- Skin: distinct markings

HIPS

- Clunks vs clicks
- Risk factors
    - Breech
    - Females
    - Multiples
    - Early referrals (ultrasound)



Sacral dimple

Suggested protocol for ultrasound spine in a neonate with sacral dimple or pit

- Classify the cutaneous lesion as a simple sacral dimple or pit using the criteria (isolated, < 5 mm diameter, < 25 mm from anus, base easily seen, in the midline, within the natal cleft)
- Through general and systemic examination (neurological in particular)
- Review of antenatal scans to look for associated abnormalities, especially vertebral and genitourinary

- Simple sacral dimple AND
- Normal examination AND
- Normal scans

1. No need for further investigations
2. Reassure parents

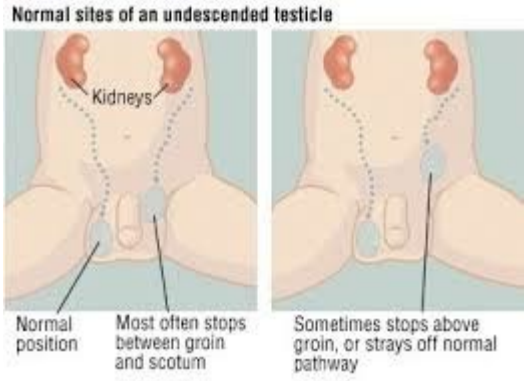
- Complex sacral dimple

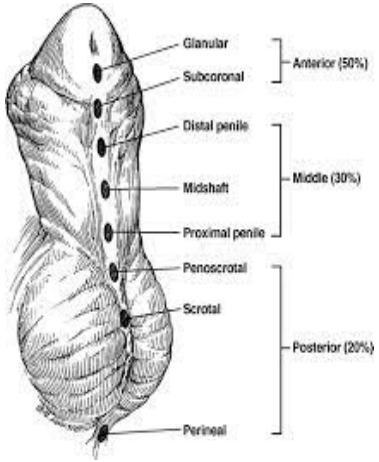
OR

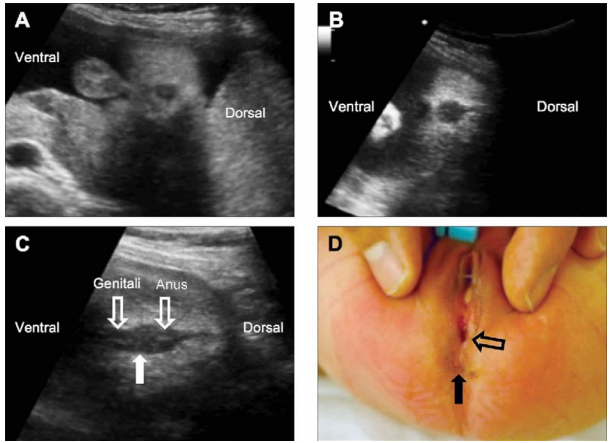
- Sacral dimple with abnormal examination /antenatal scan

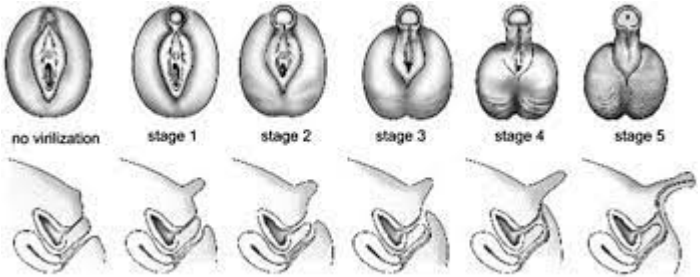
1. Ward consultant or senior registrar review
2. Arrange spinal ultrasound
3. Parental counselling

GU







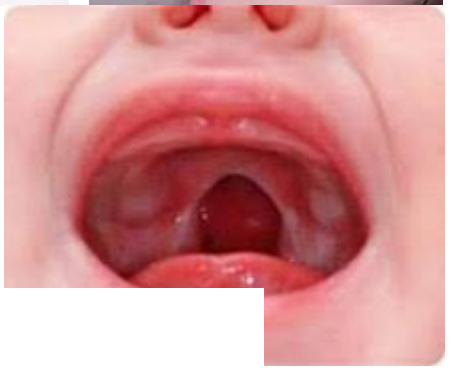


https://cps.ca/documents/position/circumcision

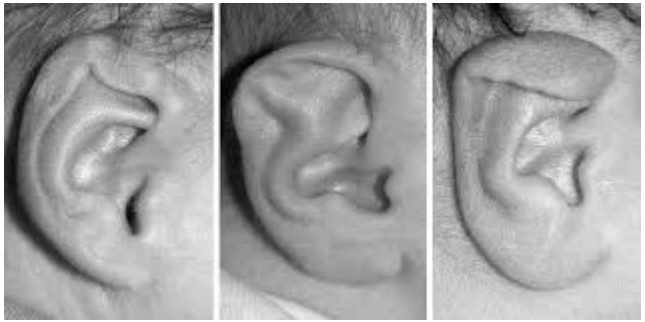
Other MSK findings

- Clavicle fractures
- Extra digits
- Hand abnormalities
- Craniosynostosis

EENT



https://cps.ca/documents/position/ankyloglossia-breastfeeding



Two types of Choanal atresia are

UNILATERAL CHOANAL ATRESIA:
this more common of the two & is also a less threatening, atresia effects just one side of the nasal passageways.

BILATERAL CHOANAL ATRESIA:
this can be a life threatening as blockage affects both passageways, causing extreme respiratory difficulty

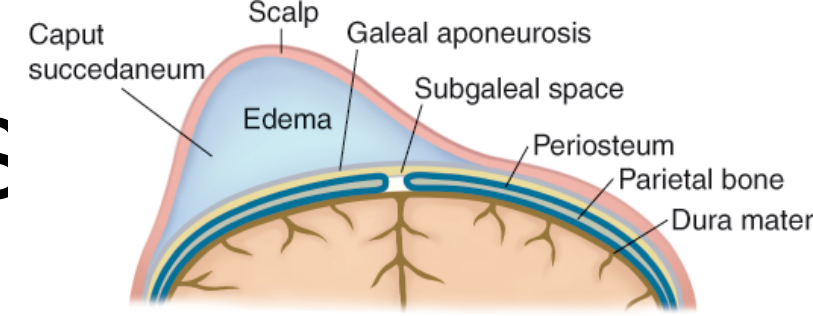
Common Newborn Rashes

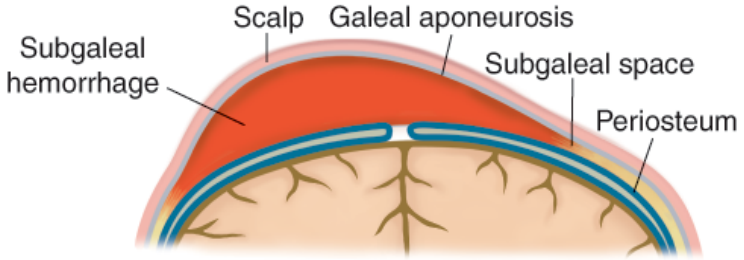
1. Erythema Toxicum Neonatorum
   - 24-48h of age; new crops every few days
2. Pustular Melanosis
   - Present AT birth; resolve 24 -48h
3. Miliaria
   - 'Heat rash'
   - Warm climates, folds of skin
   - Rx: avoid over heating, avoid occlusive creams, cool baths
4. Milia
   - Accumulation of sweat
   - Resolve first 4 weeks
5. Cephalic Pustulosis
   - 2-3 weeks of age (vs Acne 2-3 months)
   - No true comedones (vs acne)
   - Due to **malassezia** colonization - Ketoconazole if needed
6. Suckling blisters
   - Resolve within days
   - From suckling in womb

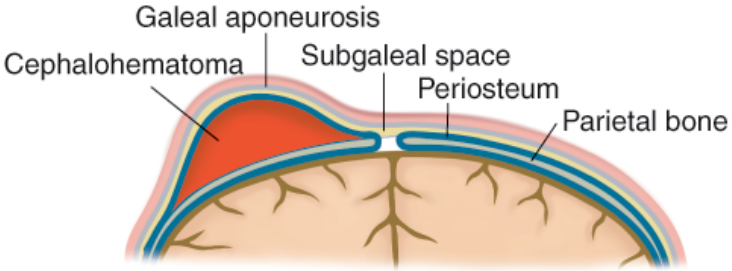
Vesicles – Emergency (call paeds) ***HSV

SCALP SWELLINGS

- Caput Seccedaneum
  - Edema, not limited by sutures
- Subgaleal hemorrhage
  - 50% from vacuum delivery
  - Cross sutures
- Cephalohematoma
  - Does NOT cross sutures



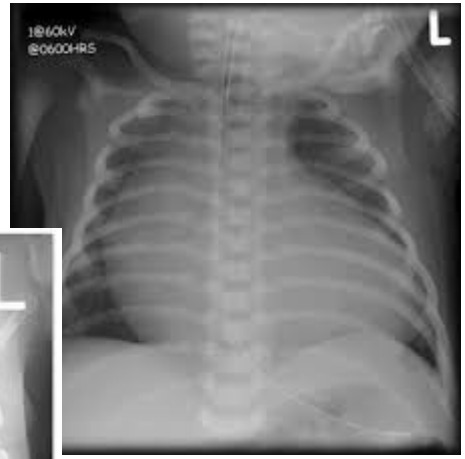


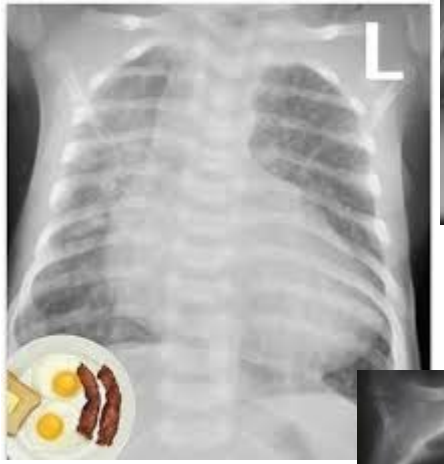


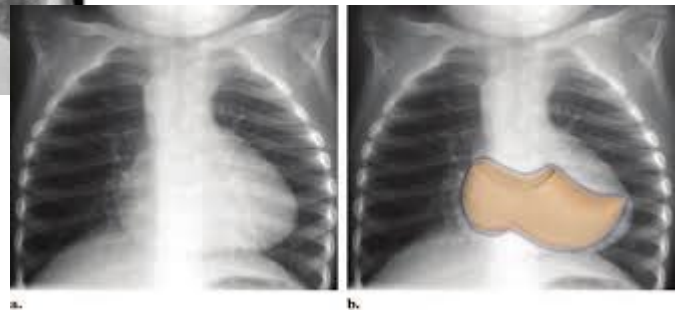
Source: F. Gary Cunningham, Kenneth J. Leveno, Steven L. Bloom, Catherine Y. Spong, Jodi S. Dashe, Barbara L. Hoffman, Brian M. Casey, Jeanne S. Sheffield: *Williams Obstetrics*, 25th Edition

Murmurs

- Most Benign
  - Changing physiology in the early newborn period
- Red flags
  - >2/6 systolic
  - Hypoxia/cyanosis
  - Do not change with positioning
  - Congested lung fields
  - Diastolic
  - Absent femoral pulses
  - Failed CCHD screening/abnormal gap in pre/post -ductal saturations
  - Cardiomegaly on CXR
  - Syndromic baby







Newborn Issues

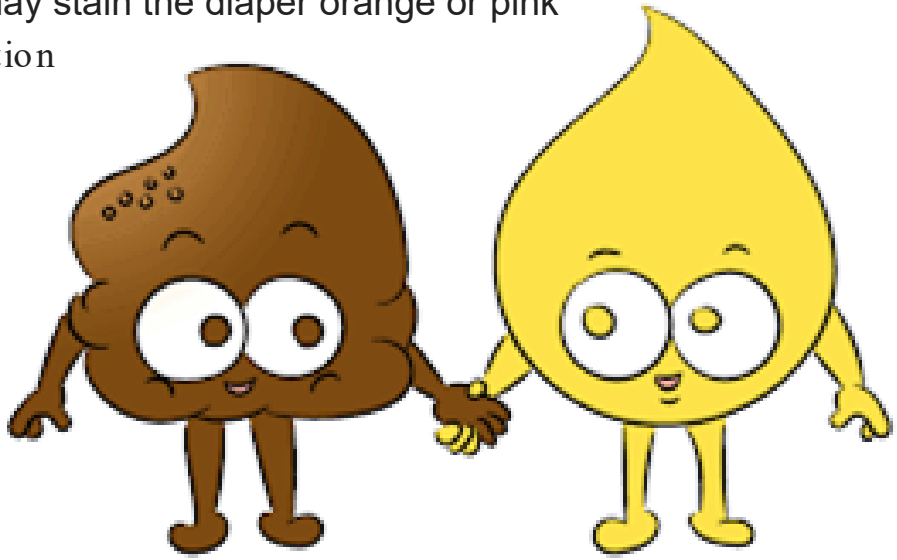
- Nutrition & Growth
- Normal stool and voiding patterns
- Hypoglycemia
- GBS
- Hyperbilirubinemia
- STIs
- Eye care
- Vitamin K
- BCG vaccination
- Cord Care
- Safe Sleep

NUTRITION & GROWTH

- **Birth Growth Parameters: Weight (IUGR, SGA, LGA), length, OFC**
- **“FED IS BEST”**
  - Breastfeeding encouraged
- Infant should be consuming close to the following amounts per feeding:
  - 1st Day - 10 - 15mL (0.3-0.5oz) - Every 2 - 3 hours
  - 2nd Day - 20 - 30mL (0.6-1oz)- Every 2 - 3 hours
  - 3rd Day - 30 - 45mL (1-1.5oz) - Every 2 - 3 hours
  - 4 - 6 Days - 45 - 60mL (1.5-2oz) - Every 2 - 3 hours
  - 1 - 2 Weeks - 60 - 90mL (2-3oz) - 6 - 10 times a day
  - 3 - 8 Weeks - 120 - 150mL (4-5oz) - 6 - 8 times a day
  - 2 - 3 Months - 150 - 200mL (5-7oz) - 5 - 7 times a day
- Normal Weight loss
  - Up to 10% total
  - Birth weight by 14 days of life

STOOLING & VOIDING

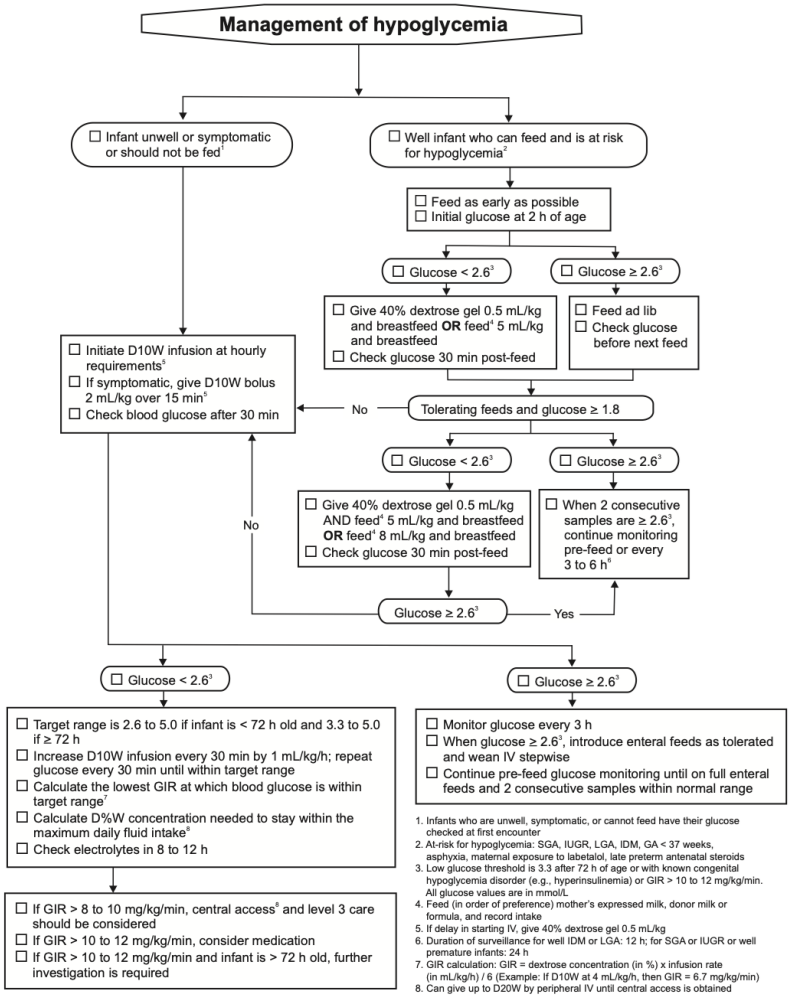
- Meconium
  - First 24-48h -- THINK HIRSCHPRUNG's or CF IF NOT!
- Urine
  - *Urate Crystals: In the first 2 days, urine may stain the diaper orange or pink
    - a **normal** result of urine concentration
  - Expected urine output
    - Day 1: 1/day
    - Day 2: 2/day
    - Day 3: 3/day
    - Day 4: 4/day
    - Day 5: 5/day
    - → 5-8/day from there forward



Hypoglycemia

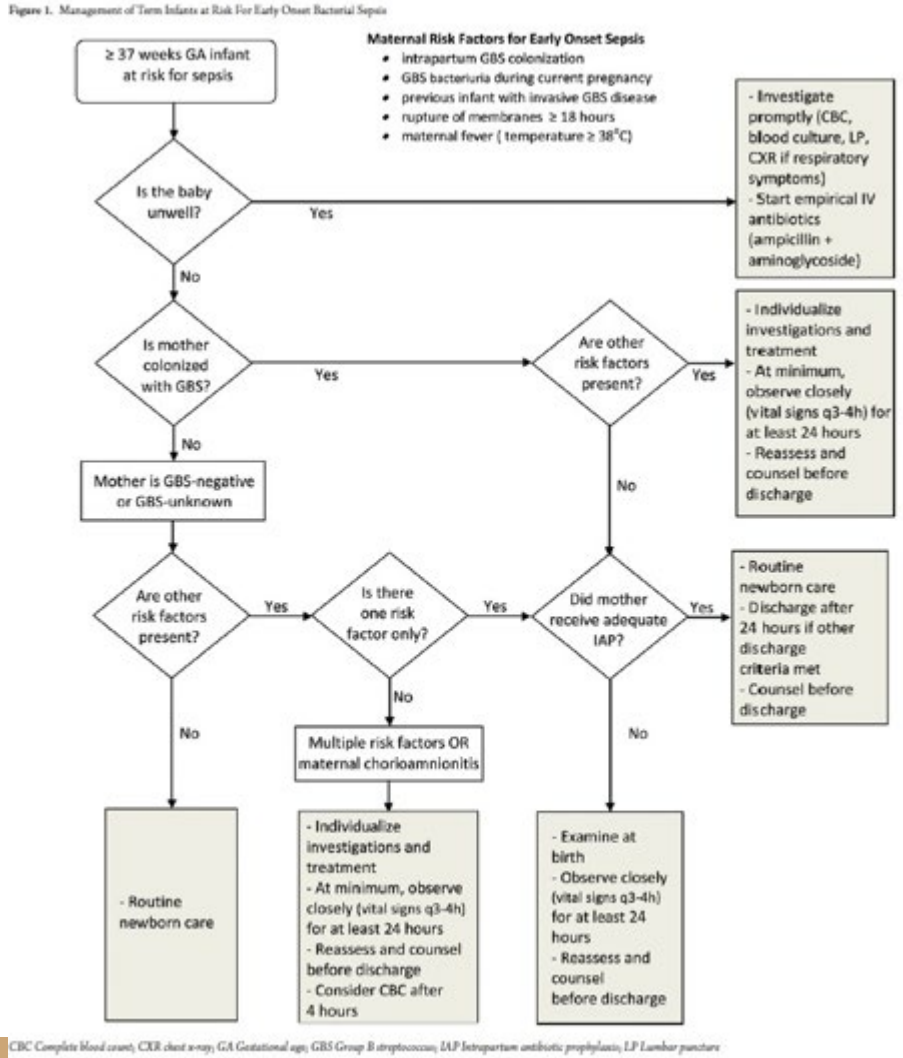
- ≥ 2.6 normal
- 1st reading:
  - <2.6
    - PO 40% glucose 0.5ml/kg + BF
    - OR formula 5ml/kg + BF
- Subsequent :
  - <1.8
    - Refer to NICU → IV D10W
    - If symptomatic: *D10W bolus 2ml/kg over 15min*
  - 1.8 - 2.6
    - PO 40% glucose 0.5ml/kg + formula 5ml/kg + BF
    - OR formula 8ml/kg + BF

https://cps.ca/documents/position/newborns-at-risk-for-low-blood-glucose



GBS/EOS

- Symptomatic → WORK UP AND TREATMENT
- Routine Care
  - GBS neg/UK, 0-1RFs + Mom treated
- Watch q3-4h
  - GBS neg/UK, 1 RF, mom not treated
  - GBS positive, +/- RF, mom not treated
- Watch q2-3h +/- CBC
  - GBS neg/UK, ≥ 2 RFs (or chorioamnionitis)



Hyperbilirubinemia

- TSB or TCB should be done in **ALL INFANTS in first 72h of life (24 -72)**
  - **Jaundice is not evident** on clinical examination when the TSB concentration is **less than 68 µmol/L** , and only 50% of babies with a TSB concentration greater than 128 µmol/L appear jaundiced
- Infants requiring intensive phototherapy should be investigated for determination of the cause of jaundice
  - Conjugated and unconjugated bili
  - Direct Coombs
  - Hg and Hct
  - CBC with differential, smear and red cell morphology
  - +/- sepsis work up
- Continue PO feeding when treat!
  - Helps with elimination
- Treatment lines = INTENSIVE PHOTOTHERAPY (double)
  - Conventional (single) considered if **35-50 umol/l BELOW threshold**

Hyperbilirubinemia

RF for **severe hyperbilirubinemia**

- Onset <24h age
- Jaundice any age before DC
- <38 weeks GA
- Sibling with jaundice
- Visible bruising
- Cephalohematoma
- Male
- Mom >25y
- ASian/Northern European
- Dehydration
- Exclusive/partial BF
- Mom group O blood

RF that those with hyperbilirubinemia get **Kernicterus**

- Dehydration
- Hyperosmilarity
- Respiratory distress
- Hydrops
- Prematurity
- Acidosis
- Hypoalbuminemia
- Hypoxia
- Seizures

Hyperbilirubinemia Cl

Step 1: Plot TCB and determine zone

- If High/intermediate → TSB (total and direct), DAT/Coombs, +/ - CBC

Step 2: Interpret TSB

- Plot on Figure 1 to determine TSB zone
- Determine response based on Table 4
- If “furhter testing or treatment required” → start standard phototherapy (single light = biliblanket)

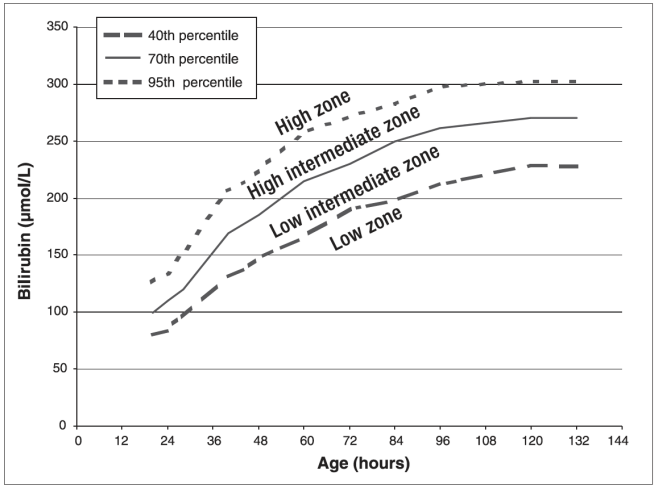


Figure 1) *Nomogram for evaluation of screening total serum bilirubin (TSB) concentration in term and later preterm infants, according to the TSB concentration obtained at a known postnatal age in hours. Plot the TSB on this figure, then refer to Table 4 for action to be taken*

TABLE 4
Response to results of bilirubin screening

Zone	Greater than 37 weeks' gestation and DAT-negative	35 to 37 6/7 weeks' gestation or DAT-positive	35 to 37 6/7 weeks' gestation and DAT-positive
High	Further testing or treatment required*	Further testing or treatment required*	Phototherapy required
High-intermediate	Routine care	Follow-up within 24 h to 48	Further testing or treatment required*
Low-intermediate	Routine care	Routine care	Further testing or treatment required*
Low	Routine care	Routine care	Routine care

**Arrangements must be made for a timely (eg, within 24 h) re-evaluation of bilirubin by serum testing. Depending on the level indicated in Figure 2, treatment with phototherapy may also be indicated. DAT Direct antiglobulin test*

Hyperbilirubinemia Charts

Step 3: plot TSB on Figure 2

- Based on risk factors, determine which risk line to follow
- If above threshold, requires INTENSIVE phototherapy (double lights = NICU consult)
- If 35-50 below threshold, start STANDARD phototherapy (single light)
- Recheck TSB (TCB not longer valid once using photo) ~6h later to ensure adequate response, then q24h
- Discontinue photo when TSB >50 below threshold.
- Check TSB for rebound 12 -24h after discontinuation

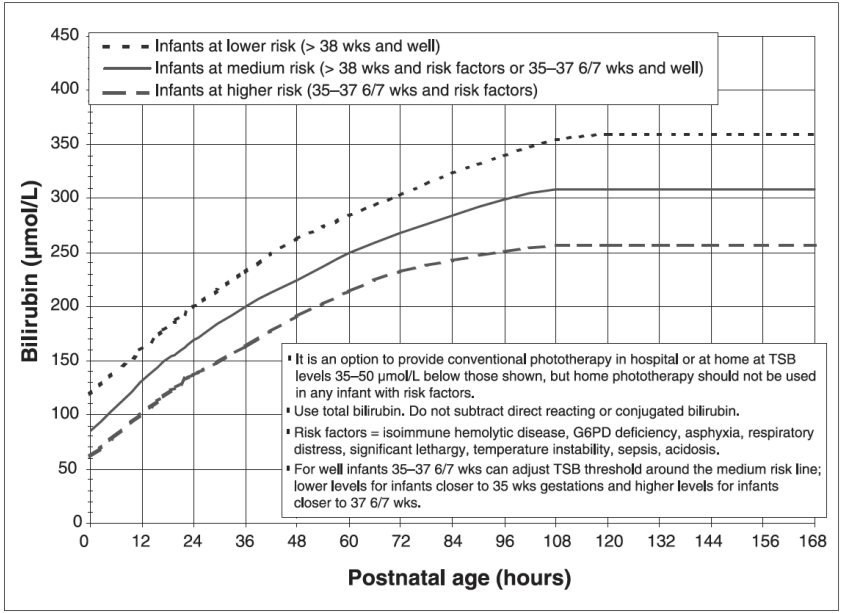


Figure 2) *Guidelines for intensive phototherapy in infants of 35 or more weeks' gestation. These guidelines are based on limited evidence and the levels shown are approximations. Intensive phototherapy should be used when the total serum bilirubin (TSB) concentration exceeds the line indicated for each category*

Hyperbilirubine

Exchange Transfusion: Figure 3

- Consult NICU
- Start immediately if acute bilirubin encephalopathy
    - Hypertonia, arching, retrocollis, opisthotonos, fever, high pitched cry

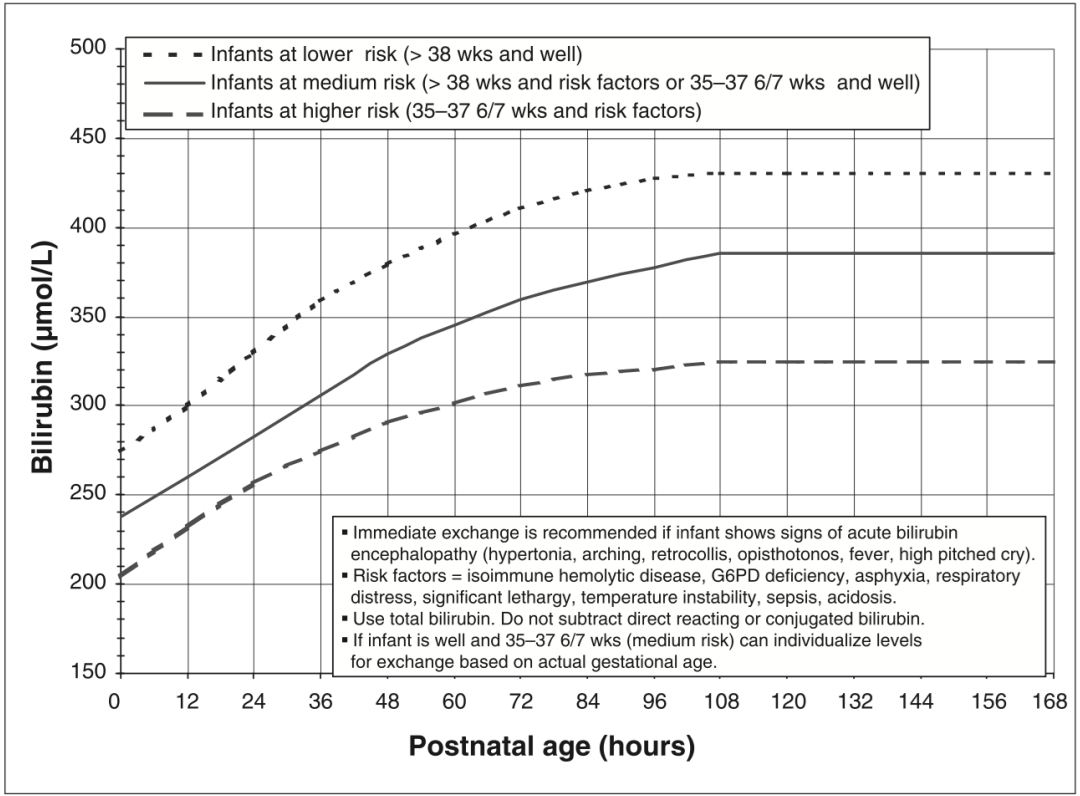
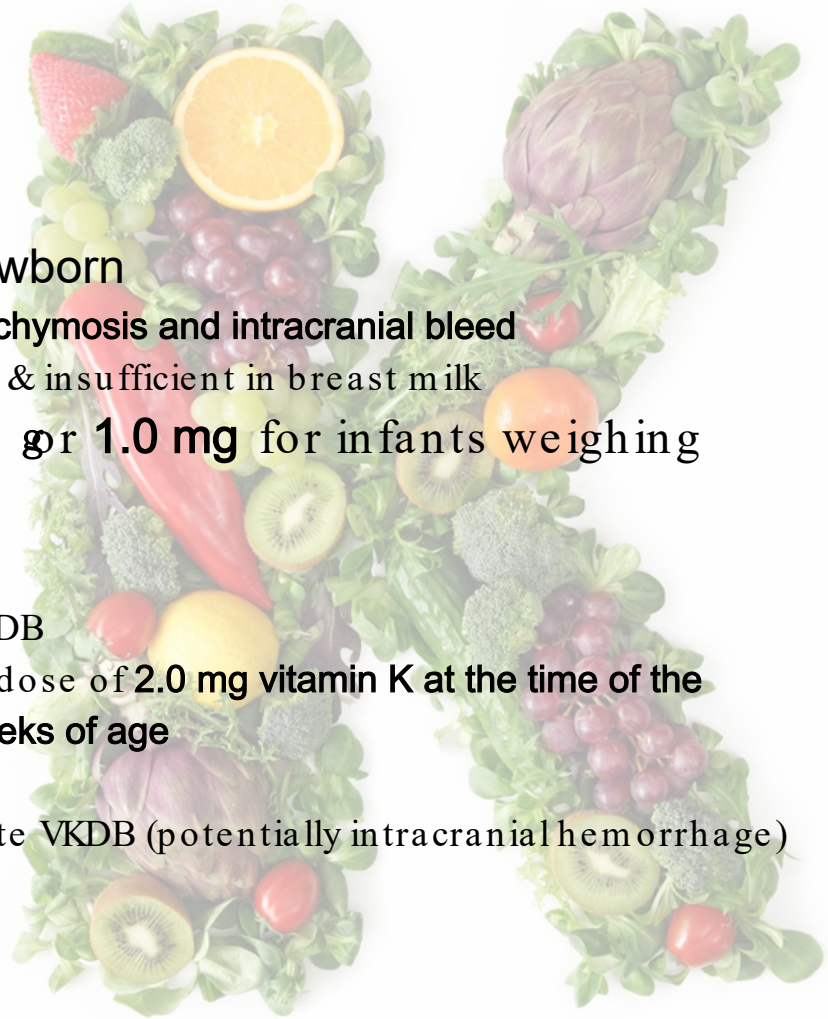


Figure 3) *Guidelines for exchange transfusion in infants of 35 or more weeks' gestation. These guidelines are based on limited evidence and the levels shown are approximations. Exchange transfusions should be used when the total serum bilirubin (TSB) concentration exceeds the line indicated for each category*

EYE CARE

- **Neonatal ophthalmia** = any conjunctivitis occurring in first 4wks of life
  - N. gonorrhoeae <1%
  - chlamydia 2 -40%
  - staph, strep, haemophilus, gram –‘ves
- Ocular PPx NOT recommended by CPS but ‘must comply with provincial regulations’
- Erythromycin 0.5% ointment within 1st hour of life
- Better treatment: **screen & treat pregnant women for STIs**

VITAMIN K

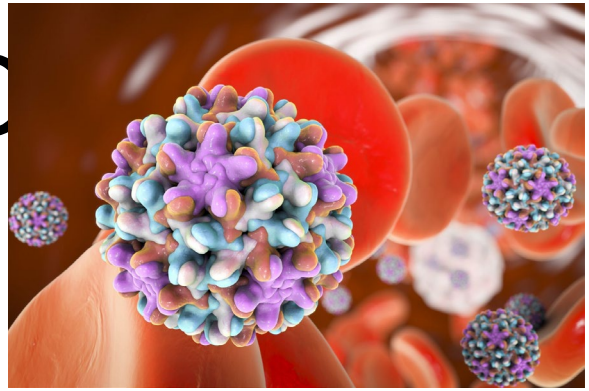


- Why: prevent hemorrhagic disease of newborn
  - unexpected bleeding often with **GI bleed, ecchymosis and intracranial bleed**
  - Vit K deficiency: insufficient prenatal storage & insufficient in breast milk
- **IM 0.5 mg** for infants weighing ⩽1,500 g or **1.0 mg** for infants weighing **>1,500 g:** within first 6h
- If Parents decline IM Vit K:
  - counselling on the serious health risks of VKDB
  - If they still decline, recommend an oral (PO) dose of **2.0 mg vitamin K at the time of the first feeding** ; **repeat at 2 to 4** ***and*** **6 to 8 weeks of age**
    - PO less effective than IM
    - Infant remains at risk for developing late VKDB (potentially intracranial hemorrhage)

BCG

- TB prophylaxis
- Who:
  - All babies of Nunavut
  - All Northern Manitoba
    - BUT need SCID testing first
    - SCID testing now routine on NMS

STIs: HEPATITIS B PRO



- Who?
  - Hep B positive mothers
  - No/limited prenatal care
- What?
  - Results within 12h:
    - HBsAg –‘ve --> do nothing
    - HBsAg +’ve --> HBV vaccine + HBIG within 12h of birth
      - HBV vaccine @ 0, 1m, 6m (<2kg at birth = 4 th dose…0,1,2,6)
      - Then HBsAg and HBsAb @ 9-12m
  - Not within 12h: PPx HBV + HBIG

STIs: SYPHILIS

- *ON THE RISE!
  - Nunavut (#1) and Manitoba (#2) have the highest rates in the world currently
- Need to have had testing in 3rd trimester
- All getting tested at the time of delivery now
- Look for paperwork in chart for all women from Nunavut

HIV Testing and Prophylaxis

- Always check status
- Point of care testing
- Need for prophylaxis
- Breastfeeding

Hearing Screening

- Universal in Manitoba
- Failed screening:
    - CMV urine PCR
    - Family history
    - Anatomical abnormalities
    - Dysmorphisms

CORD CARE

- Falls off 1-2 weeks
- Keep clean and dry
- Do not use alcohol

SAFE SLEEP

- Back to sleep
- Own sleep space - no co-bedding
- Parents room x6 months
- Nothing in crib except mattress and fitted sheet
- Sleep sacks vs blankets
  - If using blankets must be thin!
- No swaddling
- Room temperature
- Smoking cessation, avoid alcohol and drugs

Vitamin D supplementation

Breastfeeding

- Live North of Edmonton: 800 IU PO daily
- South: 400 IU PO daily for first year

Formula feeding

- 400 IU PO for first year

Many paediatricians opt to supplement all breastfed infants with 800 IU PO daily and formula fed with 400 IU PO daily

Infection Prevention and Education

- Handwashing
- Routine infant vaccine
- Flu, pertussis and COVID vaccine in pregnancy and cocooning
- Fever education
- Thermometer

Thank You

Questions???