Postnatal Ward Handbook

An aide-memoir for managing common neonatal problems on the postnatal ward

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Postnatal Ward Handbook An aide-memoir for managing common neonatal problems on the postnatal wards	University Hospitals of Leicester NHS NHS Trust Jan 2020 - Jan 2023

Scope

This guideline is aimed at all Health care professionals involved in the care of infants within the Perinatal Directorate.

Introduction

This handbook provides information about the Postnatal and Labour Ward duties of the Junior Doctors and ANNPs. It is also intended to be a guide to dealing with problems on the Postnatal Wards. It is *not* intended to be a textbook of neonatal problems.

There will be a middle grade/ANNP allocated to covering the Postnatal Wards and Labour Ward to ask about investigations and ongoing management. All infants in whom a specialist referral may be indicated should be discussed with the attending consultant.

There are also patient information sheets for many of the conditions discussed here and these should be offered to parents. Please also ensure that the General Practitioner is notified of any concerns via completion of an ICE letter for any baby when ongoing follow up is planned.

There are detailed guidelines on badgerNet to many of the problems discussed in this handbook it is important to refer to them as they contain more comprehensive information where necessary

Please discuss with the supervising middle grade / ANNP or attending Consultant regarding any infant in whom a specialist referral is thought appropriate

Contents

The Postnatal Wards (PNW)

Helpful tips

1. Babies who meet the criteria for ongoing transitional care on the postnatal ward (see section on Transitional care for details of which babies) will require admission, daily updates and discharge completed on the BadgerNet system OR ICE letter prior to going home.

2. Babies requiring inpatient care and/or investigations will require BadgerNet admission and TCU notes folder to be made. Babies requiring outpatient investigations and/or consultant follow up will require ICE letter and Manilla notes folder to be made.

3. Babies that are seen on delivery suite or the Postnatal wards that require treatment and investigations (blood tests, scans, follow-up, etc.) should have this documented.

4. If babies come to NNU for any procedure, however short the stay (e.g. Insertion of cannula for IV antibiotics) they must be formally admitted to the BadgerNet system. The Ward Clerk and the Neonatal assistants should also be notified so the relevant actions can be taken.

5. Whenever possible Child health care records (red books) should be completed prior to discharge from NNU to the Post-natal wards regardless as to whether the baby is still receiving treatment. Body map to be completed in all relevant cases.

6. Please inform neonatal assistants of ALL babies put onto 'NEWS (Neonatal Early Warning Score) charts.

- Review of infants in whom there is a concern
- Daily review of infants receiving transitional care on the postnatal ward
- Routine Infant NIPE Check
- Review of Infants discharged from NNU

There are neonatal nursing assistants who will assist you in the routine daytime work on the PNW. They will also make sure that the trolley contains any equipment and documentation that you require.

When there is no neonatal assistant cover, the PNW junior doctor/ ANNP should carry the neonatal nursing assistant bleep to ensure that the pathology/laboratories know who to contact with abnormal results in addition to completing "BadgerNet todays daily summary form" and ICE letters.

Transitional Care on the Postnatal Ward

Criteria for transitional care are listed below. These babies require admission and their care recorded daily on the BadgerNet system. At the time of discharge they should have a BadgerNet discharge letter completed and a copy provided to parents before going home.

a) Babies from birth:

• Gestational age 34+0 to 35+6 weeks who do not fulfil criteria for intensive or high dependency care
• Birth weight > 1600 g and < 2000 g who do not fulfil criteria for intensive or high dependency care (qualified recommendation)
• Risk factors for sepsis requiring IV antibiotics, but clinically stable
• At risk of haemolytic disease requiring immediate phototherapy

b) Additional care needs developing on the postnatal ward or at home:

• Inability to maintain temperature following an episode of rewarming and despite skin to skin contact and/or adequate clothing
• Stable baby who has developed (or been identified as having) risk factors for sepsis, requiring IV antibiotics
• Significant neonatal abstinence syndrome requiring oral medication or additional feeding support
• Haemolytic disease requiring enhanced phototherapy and/or assessment of serum bilirubin 4 – 6 hourly

c) Babies readmitted from the community:

• Excessive weight loss and/or poor suck requiring feeding support
• Haemolytic disease requiring enhanced phototherapy and/or assessment of serum bilirubin 4-6 hourly

d) Babies "stepping down" from the NNU:

• Corrected gestational age > 33+0 weeks and clinically stable
• Current weight more than 1600 g and maintaining temperature
• Monitoring of vital signs required no more frequently than 4 hourly***
• Stable baby with sepsis requiring ongoing IV antibiotics
• Continuing phototherapy when serum bilirubin has stabilised following IV immunoglobulin or exchange transfusion
• Palliative care when parent/carer doing most of the care

Further clarifications to common transitional care questions (Refer to appendix 1)

- BadgerNet login for postnatal ward midwife caring for the baby:
  Username = midwifepw
  Password = midwifepw
- Babies receiving antibiotics will have green TCU folder that will include sepsis booklet, NEWS chart & any other relevant documentation. The evaluation plan will be updated daily when reviewed in the NEWS chart by NNA or neonatal doctor.
- All babies on NEWS charts will also have the evaluation plan updated daily when reviewed by NNA or the neonatal doctor.

- Referrals for clicky hip, breech, renal etc. will all have information recorded on NIPE printout within the maternity notes.
- All babies with heart murmur requiring ECG or babies requiring a consultant neonatal follow up will need ICE letter and Manilla notes folder.
- All babies monitored for possible withdrawal symptoms not on a NEWS chart will have a daily update plan recorded by NNA on ICE.
- All babies requiring SBR will have a chart and the plan recorded on the back of the form following review by neonatal doctor. Please photocopy this chart on discharge for the community midwife.
- Any other babies reviewed by the neonatal team and not listed above will have a review and plan recorded in the maternal notes.
- All babies admitted to NNU and transferred back to ward will usually have a green TCU folder.
- NIPE clinic at LRI only- please continue to write any referrals on continuation sheet and give to NNA.
- Please keep all NEWS charts & SBR charts in the NEWS folder on admission to the ward.
- When the baby is discharged from neonatal care the ICE/badgerNet discharge will be completed and filed in maternity notes which should give you all the information for completing E3 discharge. The parents will also be given a copy of the discharge letter.

Foetal Alerts

Some neonatal problems are diagnosed antenatally. In these cases an information sheet is sent to the neonatologists and scanned into the neonatal alert folder on a shared drive. NNU Clinical Information (\\uhldata04\data3\Women's, Perinatal & Sexual Health\Neonatal) (V:).

This information sheet often includes a ***proposed management*** plan.

If you do not have access to the foetal alerts drive this can be requested through http://iamweb and the request network resources tab

Person authorising your request – (any of the following) JDA's, Marie Hoy, Mark Ainsworth
Drive – NNU Clinical Information
Letter – V:
Name a person with access – Anyone you know with access (Consultants or ANNPs)

Newborn and Infant Physical Examination (NIPE)

Almost immediately after a baby is born they should have an examination to ensure they have no gross physical abnormalities. This is carried out by one of the health professionals attending the birth.

The detailed newborn examination should normally be undertaken within the first 72 hours after birth following verbal consent from parents to perform the examination. There is no optimal time to detect all abnormalities. The aim of this examination is to detect less obvious conditions or abnormalities. It is possible to do the check within the first 24 hours.

The infant check comprises of

- Review of antenatal risk factors in particular:

- risk of congenital heart disease highlighted on antenatal scans or 1st degree relative (parent or sibling) with heart abnormalities
- Risk factors for developmental dysplasia of the hip (1st degree relative with DDH, breech presentation)
- Risk factors for inherited eye conditions such as retinoblastoma or cataract (1st degree relative)
- It is important to review whether there is a neonatal alert for a suspected foetal anomaly.

- Examination of the infant to detect congenital concerns
  - Dysmorphic infants
  - Congenital dislocation of the hip
  - Cataracts
  - Heart murmurs
  - Cleft lip and palate
  - Genital concerns e.g. hypospadias/undescended testes
- Highlighting infants that need further assessment:
  - Risk factors for sepsis
  - Jaundice
  - Feeding
- Reassuring parents about normal variations and discussing their concerns
  - Counselling parents
  - Back to sleep campaign
  - Immunisation
  - Breast feeding

The results of this check are recorded on the NIPEsmart screening website (see NIPE smart user guide Appendix 1)
https://nipe.northgate.thirdparty.nhs.uk/S4N/nhsbaby

There is an e-learning package available and those individuals performing and recording NIPE examinations should have evidence of completing this.

Any infant that is clinically unwell needs middle grade/ ANNP review and admission to the neonatal unit for further assessment.

Pulse-oximetry screening of the newborn

All newborns >34 weeks gestation who are cared for on the postnatal wards are part of the pulse oximetry screening programme and should have their saturations checked in the first 4-8 hours of life as per the guideline.

The Well Normal Term Infant

The following is a very brief guide to feeding, weight loss and normal physiological observations in the well normal term infant of > 2.5Kg.

Feeding

Breast feeding

Breast feeding should be initiated within 1 hour after delivery as this promotes release of prolactin and stimulates milk production. Breast fed infants tend to feed more frequently than bottle fed infants.

It is normal for some term newborns to only take a couple of breastfeeds on the first day. If the baby is otherwise well, this should not prompt the health care team to offer bottle feeds

Bottle feeding

Where there has been parental choice to bottle feed or a medical indication e.g. maternal HIV then a bottle feed should have been offered within 8 hours of birth.

A volume ***guide*** for the first few days of life is below:

Day 1:	50 ml/Kg
Day 2:	75 mls/Kg
Day 3:	90 mls/Kg
Day 4:	100 mls/kg
Day 5:	120 mls/Kg
Day 6 onwards:	150 mls/Kg

Weight

It is normal for infants to lose weight over the first 5-7 days of life and they are expected to have regained their birth weight by 2 weeks of age.

The maximum acceptable weight loss is 10% of the birth weight. If the weight loss is greater than this then the infant should be fully assessed and discussed with the middle grade/ANNP.

Urine and Stools

The infant should pass urine within 24 hours of birth and meconium stool within 48 hours of birth.

Normal Observations

Temperature	36.5-37.3°C
Pulse Rate	120-160 beats per minute
Respiratory Rate	35-45 breaths per minute

<u>Newborn Early Warning Score (NEWS) Chart</u>

Indications to use NEWS chart

- As per Maternity Group B Streptococcus guideline. Please refer to flowchart
- Infant of diabetic mothers
- PROM > 48hrs (Refer to guideline, appendix 8)
- Maternal temp > 37.8°C + additional risk factors

- Baby needing advanced resuscitation but with APGAR 9 at 10min
- Stable term IUGR with birth weight < 2.0 kg
- Baby >4.5kg
- Baby with birthweight on or below 2nd centile

The NEWS chart should be completed for any infant who requires 4 hourly observations (e.g. feeding, hypothermia). Any infant who requires 2 hourly or hourly observations should be admitted to the NNU

Routine NEWS charts are not required for:

- Term without risk factors for GBS (see guideline)
- Neonatal abstinence syndrome (see guideline)
- Poor cord pH (Review baby within first hour and admit if concerns)
- Antenatal concerns (abnormal CTG, foetal bradycardia etc) but well baby
- Term baby with weight >10th centile but less than 4.5kg
- Grunting < 4 hrs (Review and admit if concerns)
- Respiratory depression due to maternal narcotics (Review and admit)
- Maternal Hepatitis B, C, HIV
- One/two vessels in the umbilical cord
- Blood stained vomit (Investigate and admit if concerns)
- Green vomit (Investigate and admit if concerns)

Blood Spot Screening

The “Guthrie” test is screening test for Phenylketonuria, hypothyroidism, cystic fibrosis, Medium chain acyl CoA dehydrogenase deficiency, Sickle cell disorders, Thalassaemia major and other metabolic disorders. This is usually done at 5 to 8 days of age.

www.gov.uk/guidance/newborn-blood-spot-screening-programme-overview

Guidance for the timing of Newborn and Infant Physical Examination

The routine examination is performed between 0900hrs and 1700hrs prioritising those infants who are >24 hours of age. There is no contraindication in performing the check at <24 hours if the time allows.
(Limitations of doing NIPE <24 hours has false negative results that needs to be acknowledge)

Review any infant in whom there has been antenatal or perinatal concern earlier. All reviews should be documented with date, time, name, grade and legible signature.

Plan

- Review antenatal and perinatal notes
- Identify any risk factors for congenital abnormalities and postnatal health.
- Examine the infant following a detailed standardised approach (table 1) and help items on the NIPE smart database
- Complete relevant section within the infant notes and highlight any factors that will need review to the parents and midwife
- Input the results of the newborn examination onto the NIPE smart database and print out two copies one for patient health care record (red book) and one for the notes
- Order investigations as appropriate
- The middle grade/ senior ANNP should review any infant in whom there are concerns.
- Where deviations from the norm are noted, refer promptly according to information provided for the individual abnormalities.
- Safety net advice should be given to families in regard to common neonatal problems such as jaundice, poor feeding , temperatures, sleepiness , vomiting

Colour	Pale, blue, jaundice, pigment
Posture	Tone
Skin:	Mongolian blue spot, birthmarks, dry, abrasions, bruises
Head Circumference (cm)	
Head and Skull:	Features, hair, moulding, fontanelles, caput, cephalohaematoma, trauma
Face:	Appearance, haemangioma, asymmetry
Ears:	Dimples, position, appearance
Eyes:	Pupil response, red reflex
Mouth and Palate:	Palate, teeth
Neck and Clavicles:	Clavicles fracture, mobility, sternomastoid
Chest:	Shape, nipples
Respiratory:	Distress, cry
Lungs:	Breath sounds
Heart:	Normal heart sounds, rhythm, murmur, thrills or heaves
Femoral pulses:	Present, normal volume
Abdomen:	Liver, spleen, masses, tone
Umbilicus:	Smell, discharge, hernia
Genitalia:	Female/ male Testes descended
Anus:	position, patency
Upper limbs, hands:	Length, digits, palmar creases, syn/poly-dactyly, tone, movement, oedema
Lower limbs, feet:	Length digits, syn/poly-dactyly, tone, movement, talipes, oedema
Back and Spine:	Dimples, hair tufts, naevus, abnormal skin patches
Hips	Barlow and Ortolani test – stable?
Reflexes:	Grasp, Moro, rooting, stepping
Bowels:	opened day 1
Urine passed:	

Table 1 - Details of Baby Check

Infants Discharged from NNU

When infants have been discharged from the NNU the neonatal team should inform the PNW midwife in charge *and* the neonatal assistant. Infants that need further review should initially be reviewed and documented on a daily basis. Infants > 24 hours old should have their infant check and discharge letter completed.

Role of the Neonatal Assistant

The Neonatal Assistants can be contacted on bleep 5460 (LRI) & 4467 (LGH). Their primary role is:

- An independent role for the newborn infant on the PNW
- To liaise with medical and Midwifery staff in the examination and routine follow up of all babies. This includes:
    - Accompanying medical staff/ ANNPs during routine checks
    - To ensure that requested investigations and treatments are performed
    - To perform heel prick blood sampling tests on infants eg Guthrie test, SBRs, Glucose, CRP
    - To receive abnormal results from the pathology lab e.g. DCT
    - To generate and complete infant notes
    - To arrange outpatient appointment follow up
    - To complete “BadgerNet todays daily summary form” and update/generate ICE letters

It is also the responsibility of doctors/ANNP responsible for the postnatal wards to ensure medical management plan.

Neonatal Assistant Clinic

To provide heel prick/venous blood collection for

- Babies from NNU
- Postnatal wards

Location

Level 2, Neonatal Unit, Kensington Building or Neonatal Unit LGH

Prerequisites

- Liaise with Neonatal Assistant
- Complete blood form
- Appointment to be made via Neonatal Assistant and parents prior to discharge

Feeding Concerns

There is a “rooming-in” policy (refer to thermal protection of the newborn guideline on BadgerNet)

- Mothers have their babies by the side of the bed throughout the day and night. It should only rarely be necessary to put a baby in the nursery for any period.

The feeding policy is one of feeding on demand.

- Usually this means that a baby will be fed between 3 and 5 hours after the last feed. Breast-feeding babies may require much more frequent feeds at times.

The establishment of feeding in the first few days of life is one of the major challenges to mother and infant and requires skill and patience. The midwives are skilled in helping mothers to establish breast-feeding and this should be encouraged. The first feed should be promoted within 1 hour of delivery and breast fed infants tend to feed more often than bottle fed infants.

Management

Healthy term breastfed infant with latching problems

- Encourage mother to express milk at least 4 hourly.
- Encourage skin-skin contact and unlimited access to breast.
- Review regularly

> 10% weight loss after birth

- Examine the infant carefully for evidence of dehydration, infection and jaundice.
- If bottle-fed calculate intake (ranges from 40-120ml/kg/day first few days) and discuss with middle grade/ senior ANNP.
- May need investigations (e.g. U & E) to monitor electrolyte imbalance e.g. hypernatraemia

In ALL infants the most important aspect of assessment is the state of alertness and condition on clinical examination.

Vomiting

Regurgitation after feeds is common in the newborn infant and is often misinterpreted as vomiting.
True vomiting should be assessed for the presence of bile or blood and the following diagnoses considered:

- Sepsis, UTI, narcotic withdrawal
- Intestinal obstruction ***especially if bilious vomiting***
  - Look for evidence of obstruction (volvulus, malrotation, atresia etc)
  - Needs AXR and middle grade/ senior ANNP review
  - Inborn error of metabolism

If the infant has any of these concerns, they should be admitted to the neonatal unit and further assessed.

Loose stools

Loose stools are common in neonates and breast-fed infants may produce as many as 12 explosive very fluid stools in a day. Indications for further investigation are below:

- Excessive weight loss
- History of contact with gastroenteritis
- Clinically unwell

Small for Gestational Age Infants

A definition of small for gestational age (SGA) infants is when the birth weight lies below the 3rd centile. This may be due to intrauterine growth retardation (IUGR) and may be symmetrical or asymmetrical. There are a number of aetiological factors and these include:

- Congenital syndromes
- Intrauterine viral infection e.g. cytomegalovirus (CMV)
- Maternal pre-eclampsia

SGA infants often have poor fat reserves and are less able to cope with intrapartum hypoxia and more likely to have problems with hypoglycaemia. The main concerns with SGA infants are listed below:

- Thermal care
- Hypoglycaemia
- Polycythaemia

Management

- Examine carefully for congenital abnormalities and any signs of congenital infection such as petechiae, hepatosplenomegaly etc
- Examine for signs of polycythaemia, jaundice or dehydration
- Encourage skin-skin contact and unlimited access to breast (if wants to breast feed).

Large for Gestational Age Infants

The birth weight of term infants continues to increase. Infants that are large for gestational age (LGA) are defined as > 97th centile and the main causes are listed below:

- Normal
- Infant of a diabetic mother
- Beckwith Wiedemann syndrome / other genetic overgrowth syndromes

Infant of Diabetic Mother

These infants are hyperinsulinaemic and are therefore at risk of hypoglycaemia in the first 48 hours of life. The main neonatal concerns are:

- Birth injury
- Respiratory distress

- Polycythaemia
- Hypoglycaemia
- Hypocalcaemia
- Feed intolerance

Prevention of hypoglycaemia

Encourage mothers to feed their babies as soon as possible (within 30 minutes of birth) and then at frequent intervals (2-3 hours).

Management

- Examine for signs of birth injury or congenital defects
- Pay particular attention to skin colour (plethora or cyanosis) and the cardiovascular and respiratory systems
- Feed 2-3 hourly until prefeed blood glucose levels are ≥ 2mmol/litre

Babies of women with diabetes should be admitted to the neonatal unit if they have:

- Hypoglycaemia associated with abnormal clinical signs
- Respiratory distress
- Signs of cardiac decompensation due to congenital heart disease or cardiomyopathy
- Signs of neonatal encephalopathy
- Signs of polycythaemia and are likely to need partial exchange transfusion
- Need for intravenous fluids
- Need for tube feeding
- Jaundice requiring intense phototherapy and frequent monitoring of bilirubinaemia
- Been born before 34 weeks (or between 34 and 36 weeks if dictated clinically by the initial assessment of the baby and feeding on labour ward)

Babies of women with diabetes should not be discharged from hospital until they are feeding well and maintaining glucose levels. For most babies, this will be ≥24 hours.

- **Refer to guideline on the prevention of hypoglycaemia on the postnatal wards available on BadgerNet**

Polyhydramnios

The Aetiology of polyhydramnios:

- Foetal malformations and genetic disorders (8 to 45 percent)
- Maternal diabetes mellitus (5 to 26 percent)
- Multiple gestation (8 to 10 percent)
- Foetal anaemia (1 to 11 percent)
- Other (e.g., congenital viral infection, Bartter's syndrome, hydrops foetalis, neuromuscular disorders)

Management

Most women with polyhydramnios will deliver healthy babies with no problems. However idiopathic polyhydramnios may be a warning sign of a birth defect in the baby such as tracheo-oesophageal fistula. The routine passage of a NG tube to confirm patency of the oesophagus is not indicted.

Refer to BadgerNet for detailed guidance on how to assess and manage infants with an antenatal finding of polyhydramnios

Hypoglycaemia

The effect of asymptomatic hypoglycaemia on neurodevelopment in the newborn infant has been the subject of much discussion and controversy in the neonatal literature. ***Symptomatic hypoglycaemia*** is usually associated with an underlying medical condition and should always be aggressively investigated and managed.

In a normal appropriately grown term infant, asymptomatic ***transient*** hypoglycaemia is probably a normal phenomenon and the newborn infant has alternative fuels such as ketones that are utilised in this situation.

Management of babies at risk of hypoglycaemia on Delivery suite and postnatal wards is summarised in Hypoglycaemia Guideline available on BadgerNet.

Managing Infants requiring antibiotics on the postnatal wards

Antibiotics may be started empirically where there are perinatal risk factors for infection. The Antibiotic Guideline for Early and Late Onset Neonatal Infection contains full details of criteria for commencement of antibiotics in line with NICE Guidance for the Management of Early Onset Neonatal Infection.

If a baby is commenced on antibiotics a sepsis booklet should be completed and maintain throughout their treatment course. They also require admission and daily records on BadgerNet of their care. At the time of discharge the parents should receive a discharge letter from badgerNet detailing the care their baby has received.

All infants that are on antibiotics but remain on the PNW should be on a NEWS chart and reviewed by the postnatal junior doctor/ ANNP on a daily basis. Their care should be documented under a transitional care admission on BadgerNet. They may be discharged home on the day that they complete the course as long as there are no ongoing clinical concerns

Advice for parents at discharge

Women identified as ‘at risk’ of neonatal GBS infection should be advised of the signs of neonatal GBS infection prior to discharge home with their baby. If they have received antibiotics they should receive a GBS parent information leaflet and a record of this being given should be made in the sepsis pathway booklet.

Identification of GBS colonisation after delivery

Occasionally a genital tract swab or MSU taken antenatally or during labour will be subsequently reported postnatally indicating maternal GBS colonisation. Management of the baby should depend on the age of the baby and any additional risk factors present.

Baby less than 48 hours old

Still in hospital
Review baby on postnatal ward

Baby at home
Review algorithm
If this suggests no active treatment, or observation only, inform the community midwife and GP and ask them to advise the mother and undertake review of the baby.

If the algorithm suggests that a septic screen or antibiotic treatment is required then offer **readmission to the paediatric ward** so that the baby can undergo appropriate evaluation and/or treatment.

Baby more than 48 hours old

Still in hospital
Review the baby on postnatal ward

Baby at home
Inform community midwife and GP and ask them to advise the mother and undertake review of the baby

All of the above advice relates to clinically well babies. Unwell babies should receive urgent medical attention regardless of age, risk factors and whether or not they are still in hospital.

90% of early onset neonatal GBS infection will occur in the first 24 hours. Typical signs include grunting, lethargy, irritability, reluctance to feed, rapid/slow heart rate, low blood pressure, high/low temperature, rapid/slow breathing and cyanosis.

Jaundice
(Refer to guideline available on BadgerNetrnet)

Neonatal jaundice is common and occurs as a normal physiological event in up to 60% of full term infants. There are two main aims of identifying jaundice:

- To prevent bilirubin encephalopathy (kernicterus)
- To identify medical causes of jaundice

It is important to be aware of the mother's blood group as this may indicate whether the infant is at risk of haemolytic disease of the newborn.

Management

- Relevant history includes a family history of spherocytosis, raised maternal blood group antibodies, excessive bruising at delivery

- A full examination of the neonate should be performed paying particular attention to signs below:
  - General heath, signs of infection
  - hydration
  - Hepatomegaly, splenomegaly
  - Concealed haemorrhage e.g. cephalohaematoma

Remember: Infection can exacerbate hyperbilirubinaemia

- If a baby requires treatment for jaundice a discharge letter on ICE should be completed and a photocopy of the treatment chart should be made and placed in the baby' red book for communication purposes with the GP, HV and Midwife.

Measuring the bilirubin level

The bilirubinometer can be used in babies with a gestational age >35 weeks and >24 hours of life. If the bilirubin is greater than 250 µmol/l and/or within 50 µmol/l of the treatment line then this should be checked by taking a blood sample (can be processed on the gas machine). Should the infant be above the treatment threshold do not delay starting phototherapy whilst awaiting this result.

If an infant is requiring phototherapy then treatment should be guided by blood measurements (gas machine or laboratory samples.)

Early Jaundice

Jaundice within the first 24 hours must be fully assessed and ***a bilirubin level taken.*** They should be considered for ***immediate phototherapy*** and a repeat SBR should be taken at 4 hours to document the rate of rise of bilirubin.

These infants should also be investigated for haemolytic disease of the newborn and the following tests should be performed

- Blood Group / Direct Coombs test (see below)
- FBC and film / reticulocyte count
- Septic screen unless known cause
- Depending on the rate of rise, Monitor bilirubin 4-6 hourly
- Consider G6PD (EDTA bottle, particularly in infants from the Asian community)
- If the **DCT is positive and required treatment for jaundice (phototherapy) or other evidence of haemolytic jaundice** (HB, film for RBC morphology, SBR, haematocrit, G6PD etc)
  - Commence folic acid supplements
  - Arrange to check FBC and SBR by Neonatal Assistants in 2 weeks
  - Neonatal Assistant clinic- The blood results are discussed with SCBU Registrar or ANNP. Outpatient FU with Neonatal Consultant in 6-8 weeks arranged if required

Remember: Jaundice within the first 24 hours is pathological and must be investigated.

Physiological jaundice

This is the most common type of jaundice (diagnosis of exclusion) and can be exacerbated by feeding difficulties and dehydration.

Treatment

The main treatment for hyperbilirubinaemia is phototherapy and the guidelines for phototherapy treatment in term infants can be found in the NICE Guideline. There are also charts on which bilirubin results can be plotted to guide treatment.

An exchange transfusion should be considered in any infant that has a bilirubin of > 400 micromoles / l. These infants should be admitted to NNU and fully investigated and managed according to unit Jaundice guidelines.

Rhesus negative Mothers

Rh negative mother's should have received prophylactic anti D in pregnancy reducing the risk of Haemolytic disease in the newborn.

Routine anti-D prophylaxis can give false positive DCT; therefore routine cord and neonatal bloods should not be taken for DCT. However DCT and other investigations should be done in all Jaundiced Infants and in those at risk or suspected to have haemolysis.

Direct Coombs Test

The routine testing of all cord and neonatal blood was discussed and a decision to cease routine testing approved at the Women's and Perinatal Clinical Governance committee and the Women's and perinatal Transfusion Committee.

A Direct Antiglobulin test is performed on the babies of mother with known blood group antibodies and babies where haemolysis may be indicated by other parameters such as jaundice or anaemia.

Cord blood samples are taken for group and typing to decide if a mother requires subsequent anti D in the postnatal period as follows:

If the baby is Rh-D negative, Anti-D is not indicated and that should be documented in the notes and Pathway.
If the baby is Rh-D positive, 500 IU anti-D Ig should be administered IM to previously non-sensitised Rh-D negative women, within 72 hours of the delivery after obtaining informed consent from her.

This is of importance to the neonatal team because:

If a cord blood sample is not collected for any reason, a heel prick sample from the baby should be obtained as soon as possible to check Rh status (BCSH c, 2006).

If a sample cannot be obtained, the baby should be assumed to be Rh-D positive for the purpose of administration of anti-D Ig.

Please see maternity guideline 'Anti D Immunoglobulin guideline for administration' available on insight for more information.

Prolonged jaundice

All term infants that remain jaundiced at 2 weeks of age (3 weeks if born before 34 weeks) should be evaluated for the presence of ***pale stools or dark urine*** and investigated to exclude a conjugated hyperbilirubinaemia.

Please see LRI Children's Hospital Guideline – Prolonged Jaundice- assessment and investigation available on insight for guidance on investigation required.

Dysmorphic Infants

An isolated dysmorphic feature is a common normal finding. The association of more than one feature should make one consider a specific genetic syndrome.

Management

Examine the infant thoroughly paying particular attention to:

- Identifying dysmorphic features
- Cardiovascular system
- Perform rapid FISH for Trisomies and microarray **after D/W duty consultant Neonatologist**.
    - At least 2 mls of blood must be placed in a lithium heparin tube and an EDTA sample for DNA storage and sent to the clinical genetics lab (at weekends this can be stored in fridge and sent on Monday morning).
- Do not separate mother and baby unless there is a life-threatening anomaly.

Do not send blood for genetic analysis OR refer to clinical geneticists without the knowledge of the duty consultant.

Down's syndrome

(See Down's Syndrome Guideline on BadgerNet)

The antenatal screening does not detect all cases of trisomy 21; current screening gives a risk rather than an absolute diagnosis. The main differential diagnosis includes congenital hypothyroidism and this can also coexist.

Management

Review maternal notes for information about maternal age, antenatal screening, and family history.

The **Senior Medical Doctor/ Senior ANNP** should examine the infant for the signs of Down syndrome which include:

- Hypotonia / brachycephaly / low set ears / single palmar crease
- Examine cardiovascular system carefully
  - pre + post ductal oxygen saturations
  - Arrange ECG looking specifically for the superior axis of an AVSD
  - Inform attending consultant neonatologist
- Look for signs of polycythaemia and send a FBC and Film
- Confirm karyotype by sending 2 mls of blood in a lithium heparin tube to clinical genetics for a rapid FISH for Trisomy 21.
- Inform attending neonatal consultant

If Down's syndrome is confirmed:

- Perform thyroid function tests and a FBC and Blood Film
- Go through Leicester Partnership Care Pathway paperwork with parents
- Discuss with the cardiologists at the Glenfield Hospital as an echo OPA is necessary even if CVS examination is normal within 2/52 weeks
- Complete SPA (Single point of access) referral
- Neonatal Follow Up in 6-8 weeks

DO NOT routinely refer Down's babies to Clinical Geneticists. A clinically normal infant does not need to have chromosomes sent just because there was a high risk on antenatal screening.

Heart murmurs

It is common to hear a systolic murmur shortly after birth but several papers have suggested that up to 50% of neonatal heart murmurs may indicate underlying heart conditions of which the commonest are patent ductus arteriosus, branch pulmonary stenosis or tricuspid regurgitation. It is also important to remember that not all congenital heart disease will be associated with a heart murmur. It is important to identify those infants that will need further investigation. If a cardiology referral is needed complete the referral form and fax/ email over to Glenfield

One of the main concerns is to ***identify obstructive left sided lesions*** that may be ***duct dependent*** e.g. Coarctation of the aorta / hypoplastic left heart / interruption of aortic arch as well as severe cyanotic heart disease requiring early intervention.

Management

The aim is to identify those infants that require further investigation and follow up and a full examination of the infant should be performed paying particular attention to:

- Dysmorphic features
- Cyanosis

- Brachial pulses / femoral pulses
- Tachypnoea / hepatosplenomegaly

If there are clinical concerns then the infant should be admitted to the neonatal unit for further clinical evaluation.

Isolated systolic murmur with normal femoral pulses

- Perform an ECG, pre and postductal oxygen
- If infant is to be discharged then discuss the infant with the middle grade or Consultant.
- If the results are normal arrange an **Neonatal OPA** for 6 weeks (summarise the findings on the cardiac referral form and file in the notes)
- If abnormal d/w cardiology re Echocardiography and further plan

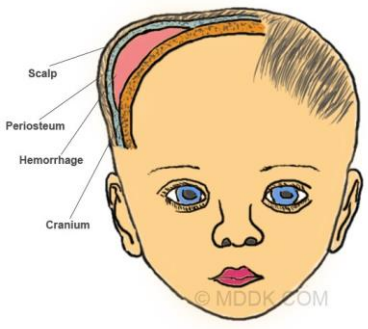
Referral criteria to cardiology (refer via fax 2422/email and ICE letter)
!st degree relative with congenital cardiac condition requiring surgery at or shortly after birth
Antenatal plan for postnatal echocardiography

Parents should be made aware of symptoms/signs of concern and given information leaflet on heart murmurs.

Skeletal abnormalities

Congenital skeletal abnormalities are common and may occur in isolation or in association with dysmorphic syndromes or neuromuscular disease. Birth injuries may also affect the skeletal system.

Cephalohematoma



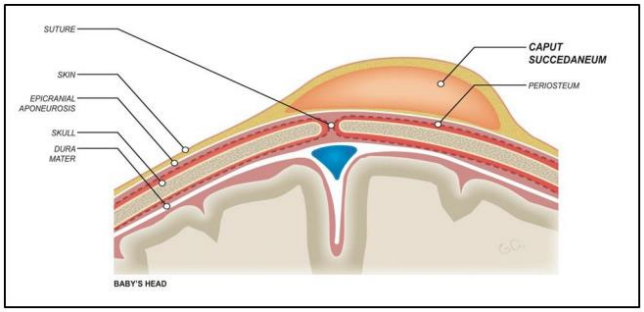
This is a sub periosteal collection of blood and it is most commonly found over the parietal bone
They have the following features:

- Usually Unilateral
- Do not cross suture lines
- Spontaneously resolve

Although these usually resolve by 6 weeks they may persist for longer with calcification prior to resolution.

Cephalohematoma : Showing the Scalp, Periosteum, Hemorrhage and Cranium courtesy of Google image https://mddk.com/cephalohematoma.html *no copyright infringement intended*

Caput Succedanuem (Chignon)



This is commonly associated with a ventouse extraction and has the following features:

- Variable scalp position
- ***Do*** cross suture lines
- Spontaneously resolve

Image courtesy of https://media.starship.org.nz/practice-recommendation-for-neonatal-subgaleal-haemorrhage/Neonatal_Subgaleal_Haemorrhage_Oct_2018.pdf *no copyright infringement intended*

It is also important to be aware that ventouse extraction has been associated with subaponeurotic (***subgaleal***) haemorrhage. The bleeding in this situation can be extensive and result in neonatal shock secondary to hypovolemia.

Subgaleal haemorrhage

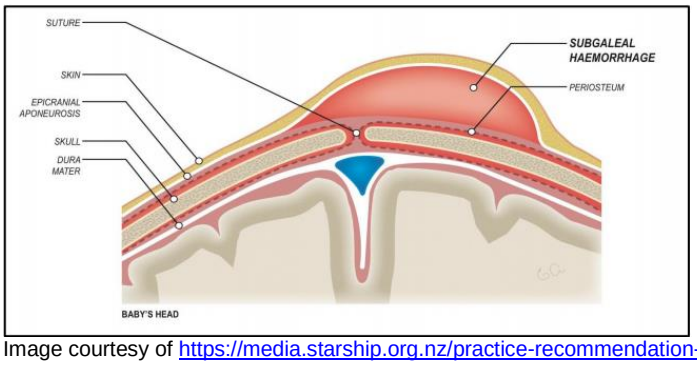


Image courtesy of https://media.starship.org.nz/practice-recommendation-for-neonatal-subgaleal-haemorrhage/Neonatal_Subgaleal_Haemorrhage_Oct_2018.pdf *no copyright infringement intended*

If you suspect a subgaleal bleed (boggy, expanding swelling which crosses suture lines) then an urgent senior review is required and consideration of intracranial imaging is required.

Developmental Dysplasia of the Hip (DDH)

The following are the main risk factors for DDH:

- Family history (first degree relative i.e. sibling or parent) of DDH,
- Breech up to and after 36 weeks (including those babies delivered following an ECV

Management

Screening for risk factors

- Arrange USS Hips (6weeks) for all those infants with the above risk factors on ICE.
- In cases of multiple pregnancy scans to be arranged for all infants if one is breech.

Clinical management

- Examining the hip joint properly requires you to examine each side separately while stabilising the other side and examination needs to be firm.

- Examine for clues to DDH such as asymmetrical skin creases
- Examine for limited abduction (dislocated hip that is unable to relocate)
- Perform Ortolani and Barlow's tests
  - If you have any doubt ask SpR to review
- Clicky hips will need USS hips to be performed within 6-8 weeks (UK NSC 2011) a direct referral will be made to hip clinic if this scan is abnormal
- Refer dislocatable or dislocated hips immediately to Orthopaedic Consultants via email to baby scan clinic within 2/52 weeks – babyscanclinic@uhl-tr.nhs.uk

Hips in which there are concerns should not be repeatedly re examined

Talipes equinovarus

- Foot is plantar flexed and deviated to the midline

Postural/ Positional talipes

- Passive manipulation should return feet to neutral position
- No intervention required

Fixed Talipes equinovarus

- Fixed position
- Check for spina bifida
- Refer for Hip USS as risk of DDH
- Email to named orthopaedic consultant
- Email to Orthopaedic specialist Service

Talipes Calcaneo valgus

- Foot is dorsiflexed and everted
- Check for spina bifida
- Refer for Hip USS as risk of DDH
- Email to named orthopaedic consultant
- Email to Orthopaedic specialist Service

Spinal dysraphism

The term "spinal dysraphism" refers to congenital abnormalities of the spine that are characterised by midline defects. Spina bifida and myelomeningocele are "open" forms of spinal dysraphism while a skin covering protects "closed" or occult lesions. In these closed lesions it is important that the skin is examined carefully for clues to any underlying abnormality.

Management

The neonatal spine should be examined for:

- Focal hair patches, subcutaneous lipomas, capillary haemangiomas, lumbar dermal sinus, scoliosis

Associated abnormalities include:

- Asymmetry of leg or buttocks or foot deformities

If a spinal dysraphism (mass, discoloration, hairy patch) MRI indicated and this should be discussed with the neonatal consultant.

Sacral Pits

Sacral cutaneous pits are common. Those that lie below the natal cleft are usually benign and do not require further investigation or review.

Management

- Simple dimples below the natal cleft -No Investigation
- Simple dimples above the natal cleft, base not seen senior medical review.
- No imaging required is required if less than 2.5 cms from anus, less than 5mm diameter
- MRI required if high enough (LS junction for dorsal dermal sinus)
- Dorsal dermal sinuses occur at the lumbosacral junction. There is often a misconception around seeing the base for which there is no evidence to suggest association with pathology.
- If there is a dimple and association (anorectal malformation etc) MRI indicated

Accessory Digits (Polydactyly)

In the past rudimentary accessory digits used to be removed by the neonatal team. This is no longer appropriate and the infants should be referred to Consultant plastic surgeon.

Fused digits (syndactyly)

These infants should be examined for other associated abnormalities as there are a variety of "syndromes" associated with syndactyly.

- Refer to consultant plastic surgeon at LRI
- Refer to Clinical Genetics if concern. (Isolated syndactyly do not need genetic referral)

Facial Nerve Palsy

A lower motor neurone facial nerve palsy can occur following delivery. Particularly at risk are those babies delivered by forceps. Most will resolve but follow up should be arranged in the neonatal clinic for 6 weeks discharge. If the baby has an inability to close the eye on the affected side lubricant for the eye should be prescribed.

Brachial nerve injury

(refer to Erb's Palsy Guideline on BadgerNet)

Brachial nerve injury occurs as a rare complication of childbirth and the incidence is rising because of the increase in birth weight. The other risk factors are listed below:

- Multiparous mother / shoulder dystocia
- Assisted delivery / prolonged second stage

The pattern of injury depends on nerves of the brachial plexus that are involved and the association of Horner syndrome suggests that all of the roots have been affected. The severity depends on the type of nerve injury and this will range from neuropraxia (stretching) to avulsion (complete separation). **The pattern and extent of nerve injury will affect the degree of recovery and whether neurosurgery is indicated.**

Management

- Examine for Horner syndrome / bony injury / pattern of nerve injury
- CXR including upper limb on affected side - to assess diaphragm / clavicle and humerus
- Urgent Physiotherapy assessment within 2 weeks
- Paediatric outpatient clinic (OPA) 6 weeks

Clavicular Fractures

Clavicular fractures can result following any type of delivery but are more commonly seen following operative deliveries or those complicated by shoulder dystocia. They can be difficult to diagnose but may present with reluctance to move the arm on the side with a fracture, tenderness on palpation over the clavicle during the NIPE, swelling or discomfort on handling. They can be diagnosed on an x-ray if there is strong suspicion of a fracture and rarely require treatment other than simple analgesia. If there is a confirmed fracture on imaging this should be discussed with the paediatric orthopaedic team and neonatal consultant follow up can be discussed with the service consultant.

Renal tract abnormalities

(Refer to Congenital Abnormalities of the Kidney and Urinary Tract Guideline on BadgerNet)

A significant number of renal tract abnormalities are detected before birth on the antenatal ultrasound scan (1.4 - 7.6 per 1000 live births). It is important to be aware that some abnormalities may be missed if scanning is only performed in the early part of pregnancy. Investigation of the antenatally diagnosed child is aimed at delineating the abnormality, identifying obstruction and preserving renal function.

All antenatally detected abnormalities of the renal tract must be investigated postnatally and followed up.

The following renal abnormalities can be detected:

- Structural abnormalities of the ureters and bladder such as hydronephrosis
- Dilatation of the ureters may be:
  - Transient or permanent
  - Mild - Severe
  - Obstructive or non-obstructive due to vesico-ureteric reflux.
  - Unilateral or bilateral
  - Associated with normal or abnormal renal function (may be reversible or irreversible)
- Abnormalities of renal substance, e.g. cysts

Management on PNW

- All infants with antenatally diagnosed renal problems should have an antenatal alert in the maternal notes and saved on the foetal alert drive that describes the management plan.

Bilateral hydronephrosis in a male infant may indicate posterior urethral valves and requires an urgent assessment and renal USS evaluation whilst still an inpatient. They should not have 6 hour discharge. If the urinary stream is good they can have outpatient investigations marked as urgent.

Do not routinely book MCUG/DMSA/MAG3 etc without the discussion with the attending consultant neonatologist.

- Ensure baby passes urine
- Book inpatient renal USS or and/or outpatient renal USS on ICE with 2/52 weeks
- Refer to paediatric nephrology clinic for follow-up

Single umbilical artery

The infant should be examined carefully for dysmorphic, skeletal, neurological and cardiac concerns. No intervention needed if the single vessel cord is an isolated concern.

Umbilical Hernia

These are more common in Afro-caribbean infants and the overwhelming majority will spontaneously resolve.
No neonatal intervention or follow up is required.

Cleft lip and palate

During the NIPE examination the palate should be inspected as per RCPCH Best Practice Guidance Palate examination: Identification of cleft palate in the newborn October 2014 https://www.rcpch.ac.uk/sites/default/files/2018-04/2015_palate_examination_-_best_practice_guide.pdf

Assess feeding and presence of other features consistent with Pierre- Robin Sequence, refer to the Cleft Lip and Palate team in Nottingham

Send Blood tests for 22q deletion and stored sample for further analysis should it be indicated (EDTA for DNA storage and Li heparin)

Please arrange Neonatal Consultant Follow up in 6-8 weeks.

The Cleft Team will arrange for the family to be visited in hospital, usually within 24 hours of birth.

Neonatal Teeth

Mobile natal teeth need to be removed to prevent aspiration

Please refer to the maxillofacial team who will kindly review the baby

Visible teeth beneath the gums are of no consequence.

Tongue Tie

Identification of a tongue tie in a baby is a common finding. Its link with poor feeding and treatment via tongue tie division is controversial and therefore surgical intervention should only be discussed if there is proven failure to establish feeding with appropriate support. If it is thought that surgical intervention is needed then this should be discussed with the service neonatal consultant before this is offered. There is currently a large RCT into management of tongue tie and the neonatal team are awaiting the results of this to give more definitive advice about the management.

Cataracts

Congenital cataracts are an uncommon but important congenital anomaly to detect. They may occur as an isolated finding or as part of a systemic disease and there is often a positive family history. The cataracts may be unilateral or bilateral and to allow normal visual development it is important that surgery is performed by 3 months of age. A delay in treatment leads to amblyopia.

The main causes are listed below:

- Congenital infection
    - Rubella / toxoplasmosis / varicella / syphilis
- Metabolic disease
    - Galactosaemia
- Genetic syndromes
    - Autosomal dominant/recessive
    - Cockaynes syndrome (Autosomal recessive)
    - Lowes syndrome (X linked with renal tubular acidosis)

Management

The examination of the eye involves using an ophthalmoscope to clearly view the cornea, iris and pupil and to obtain a red reflex on reflecting the fundi.

Other features that should be specifically looked for include

- Dysmorphic features
- Signs of congenital infection
- Micropthalmia

The investigations that should be considered are below:

- Urine for CMV / TORCH serology
- GAL-1-PUT
- Urine organic acids and Serum amino acids

The infant should be discussed with a paediatric ophthalmologist and early ophthalmological review arranged.

Urogenital concerns

The urogenital examination in a male infant should include examination for inguinal herniae, assessment that both testes are descended and examination of the penis for epispadias and hypospadias. The commonest abnormalities are hypospadias and undescended testes. The genitalia of a female infant should be examined to document normal female anatomy.

Circumcision

Routine circumcision is not performed at UHL.

Circumcision should be postponed in any infant in whom there are concerns e.g. sepsis, jaundice, family history of coagulation concerns.

Hypospadias

Hypospadias is a contraindication to circumcision, which should be informed to all parents (especially of Muslim/Jewish faith)

This is the most common abnormality and describes opening of the urethral meatus on the ventral aspect of the phallus. There is a wide variation in severity although the majority are mild and the associated absence of ventral foreskin leads to the appearance of a hooded posterior foreskin.

In all cases

- Consider as ambiguous genitalia if testes impalpable (see below guidance on ambiguous genitalia)
- Refer to Paediatric urologist

Epispadias

This is a rare type of malformation of the penis in which the urethra ends in an opening on the upper aspect (the dorsum) if the penis. This abnormality can be associated with bladder extrophy.

Discuss with paediatric urologist
Perform MSU / renal function tests
Commence infant on Trimethoprim
Consider performing karyotype
Admit to NNU if bladder extrophy

Hydrocele

An isolated hydrocele will resolve spontaneously and the infant does not require follow up.

- Examine for inguinal herniae
- Palpate testes and trans illuminate

- Record on NIPE examination
- Refer to GP for follow up examination as part of 6-8 week check

Vaginal Bleeding

This is common and occurs because of oestrogen withdrawal in female infants. No action needed.

Pink Urine

This is common in babies and occurs because of urates in the urine. Assess feeding and hydration but likely no action needed.

Ambiguous genitalia

These infants should be discussed with the middle grade/ senior ANNP and the attending Consultant

- AVOID ascribing a sex - refer to infant as "your baby"
  Describe the genitalia as not fully developed
  Explain that tests will be needed but that the sex will be known once investigations are completed.
- The following investigations should be requested
- U&E and glucose
- Urgent FISH for Y chromosome and telephone call to laboratory to ensure sample received
- 17 OH progesterone (Day 3) and LH/FSH
- Urine steroid profile
- pelvic USS- looking for intraabdominal gonads
- Discuss with paediatric endocrinologist for further investigation and management

Undescended Testes

- Bilateral undescended testes

If impalpable, treat as ambiguous genitalia especially if associated with micropenis until proven otherwise and instigate above investigations

If palpable in the inguinal canal, record on NIPE and GP to review at 6 weeks if still a concern refer to Paediatric Surgical Team

Bilateral undescended testes is sometimes an indication of 11 beta OH deficiency

- Unilateral undescended testes
  Inform GP / HV of need to review at 6/52 week check

Micropenis

This refers to a very small normally formed organ that may indicate a hypogonadotrophic state. Examine testes

- Neither testis palpable
  See ambiguous genitalia above
- Both testes palpable
  Discuss with endocrinologist and Paediatric urologist

Anteriorly placed anus

An anus which is felt to be placed anteriorly should be reviewed by a middle grade/ senior ANNP and if ongoing concern discussed with the paediatric surgical team

Inguinal Hernia

Inguinal hernia are more common in ex preterm infants.

- Examine testes
- Ensure that hernia are reducible
- Discuss with surgical team
- Do not discharge until plan is made. Likely to need surgical intervention before discharge.

Infants with inguinal herniae should not be sent home unless they have been discussed with a senior surgeon.

Maternal Thyroid Disease

Thyroid disease is common and maternal hyperthyroidism or hypothyroidism may have implications for the development of normal thyroid function in the neonate.

Babies born to mothers with hypothyroidism

This is only of a risk to the baby if the mother has a history of treated/ burnt out hyperthyroidism therefore:

- Check maternal autoantibodies:
  - Thyroperoxidase antibodies may be positive or negative, these are not harmful to baby
  - TSH receptor antibodies may be positive if hypothyroid due to treatment of Grave's disease

Management of babies whose mother's are hypothyroid

- If antibody negative or thyroperoxidase antibody only positive routine newborn examination and blood spot only
- If TSH receptor positive/ history of previous hyperthyroidism treat as per maternal hyperthyroidism

Babies born to mothers with hyperthyroidism

Check maternal TSH receptor antibody status

If mother does not have TSH receptor antibodies and is clinically well no further action is needed.

Routine thyroid screen on Guthrie only.

Risk of neonatal thyrotoxicosis if:

Current maternal thyrotoxicosis on anti-thyroid medication or previous radioiodine/surgery with positive TSH receptor antibodies

Or evidence of previous neonate with thyrotoxicosis or foetal thyrotoxicosis

These babies need careful examination for signs of hyperthyroidism:

- Goitre
- Foetal tachycardia (> 160 beats per minute at rest), irritability, poor weight gain and failure to thrive
- Rarely thrombocytopenia, hepatosplenomegaly, jaundice.
- If there is clinical concern thyroid function and antibody tests should be sent.

Discuss with neonatal consultant and consider admission to NNU

If well infant:

- Observe for 48 hours on the PNW with daily documented examination by the postnatal ward junior doctor/ ANNP
- Arrange TFTs and Thyroid Antibodies to be sent between day 5 and 10
- Advise parents of the above signs and symptoms of thyrotoxicosis

PARENT INFORMATION

CONGENITAL HYPERTHYOIDISM

Your baby has a small chance of becoming unwell with an overactive thyroid gland during the first few weeks. If your baby develops the following problems please take them to be reviewed at your local Children's Emergency Department or A&E immediately.

- Unsettled despite regular feeding
- Poor weight gain
- Irritability
- Jitteriness
- Staring eyes
- Vomiting
- Diarrhoea
- Sweating

A thyroid function blood test is not necessary / has been arranged for **(delete as appropriate)**:

Date / time..... Location .....

Maternal HIV infection

Refer to HIV screening in pregnancy and the Intrapartum/Postnatal management of women who are HIV positive available via the UHL Guidelines section of Insight

An antenatal alert form should have been sent to the neonatal team prior to delivery.
This should be saved on the fetal alert drive.

Under NO circumstances should mother be documented as HIV positive on ANY forms or in the red book

Zidovudine should be started within 6 hours of birth if indicated on the antenatal plan

Venous EDTA bloods to be taken on day 1 on postnatal wards and inform laboratory between 9-4 pm that mothers EDTA sample is also due to be received.

Follow up should be arranged with the Paediatric Virology Team and an ICE letter completed at discharge detailing any medication and follow up plans

Refer to BBI specialist midwife and BBI specialist paediatrician

Maternal Hepatitis B Infection

All pregnant women are offered antenatal screening for hepatitis B. The hepatitis B virus has three major structural antigens: surface antigen (HB_sAg), core antigen (HB_cAg), and e antigen (HB_eAg). A higher level of infectivity is associated with a mother that is HB_eAg positive and negative for the antibody to HB_e.

All mothers who are HbsAg positive are infective for hepatitis and a fetal alert should have been completed with a postnatal plan for the baby following delivery.

An infant born to a mother that is hepatitis B positive is at risk of developing chronic active hepatitis or hepatocellular carcinoma as a young adult. This risk can be reduced with immunisation in infancy.

All babies England are now offered vaccination against Hepatitis B in the routine immunisation schedule.

For guidance on babies who are at additional risk of infection due to maternal hepatitis B positive status please see:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/736036/HepBbabiesaidememoire.pdf

There is additional risk if a mother is found to be e antigen positive and anti HBe negative and in addition to vaccination these babies should receive Hepatitis B Immunoglobulin. The need for this should have been highlighted antenatally and the product ordered. It should be available on delivery suite.

Management
The infant should be reviewed at birth with the results of the maternal antigen screening.
There should be a foetal medicine referral sheet on NNU

HBsAg Positive and *Anti* HBe negative (HB Ag +ve or –ve):
Give 250 IU hepatitis B immunoglobulin I/M as soon as possible after birth if HBe Ag positive (named patient sample kept in labour ward refrigerator)
Give first hepatitis B immunisation shortly after birth. A clotted blood sample should be sent to virology prior to giving the immunisation

HBsAg Positive and *Anti* HBe Positive:
Give first hepatitis B immunisation shortly after birth. A clotted blood sample should be sent to virology prior to giving the immunisation

In **ALL** babies:
Document clearly in maternal and hospital notes the injections that have been given including batch number and site of injection.
Babies whose mothers have isolated Hepatitis B are followed up by the GP after their vaccination in hospital. If co-infection with Hepatitis C, HIV or ongoing risk factors e.g. IV drug use then arrange follow up with Paediatric Virology.

Table one: Hepatitis B doses in the immunisation schedule for routine childhood and selective neonatal hepatitis B programmes

Age	Routine childhood programme		Babies born to hepatitis B infected mothers	
Birth	X*		✓	Monovalent HepB (Engerix B® or HBvaxPRO Paediatric®) (with HBIG if indicated)
4 weeks	X		✓	Monovalent HepB (Engerix B® or HBvaxPRO Paediatric®)
8 weeks	✓	DTaP/IPV/Hib/HepB (Infanrix hexa®)	✓	DTaP/IPV/Hib/HepB (Infanrix hexa®)
12 weeks	✓	DTaP/IPV/Hib/HepB (Infanrix hexa®)	✓	DTaP/IPV/Hib/HepB (Infanrix hexa®)
16 weeks	✓	DTaP/IPV/Hib/HepB (Infanrix hexa®)	✓	DTaP/IPV/Hib/HepB (Infanrix hexa®)
1 year	X		✓	Monovalent HepB (Engerix B® or HBvaxPRO Paediatric®) Test for HBsAg

*Newborn infants born to a hepatitis B negative woman but known to be going home to a household with another hepatitis B infected person may be at immediate risk of hepatitis B infection. In these situations, a monovalent dose of hepatitis B vaccine should be offered before discharge from hospital. They should then continue on the routine childhood schedule commencing at eight weeks.

Hepatitis B passive immunisation with immunoglobulin should be given as soon as possible after birth (ideally within 12 hours) if the mother is HBs antigen +ve and the antibody to Hbe antigen is NOT detected.

Babies should have venous bloods taken prior to first vaccine being given not cord bloods. The follow up vaccine appointment will be made by Children's HIV Specialist Nurse and Specialist Support Nurse once notified about delivery. Please inform Specialist Support Nurse with the relevant details, unit no, DOB, vaccine or immunoglobulin batch no given who will then visit the women with these details prior to discharge.

Complete H1 form and email to child health records @leicspart.nhs.uk

Send copy to GP, and email BBI specialist paediatrician and BBI specialist Midwife

Maternal Hepatitis C infection

Hepatitis C (HCV) is a blood borne virus and the factors influencing its mode of transmission remains an area of investigation. Neonatal transfer has been reported in 5% of pregnancies, but can be as high as 25% if the mother is also HIV positive. Japanese studies (where a much more severe HCV genotype is prevalent) showed that only 6% of the babies born to HCV positive mothers contracted hepatitis C. Mother to baby transmission of HCV may be increased if the mother is also infected with HIV or HBV. The likelihood of transmission from breast milk is also very small and therefore breastfeeding is not contraindicated. Perinatally acquired hepatitis C infection is a serious disease that eventually leads to chronic hepatitis and there are no current treatments or vaccinations that can prevent that.

Management

The current antenatal incidence of hepatitis C is between 0.7 – 1% in this country and hepatitis C is not yet routinely screened for on antenatal serological testing at this hospital.

If a mother is known to be hepatitis C positive:

- Check for results of HIV and Hep B serology
- Check midwifery notes for any evidence of maternal IV drug use
- Dictate a referral letter to paediatric virologist who will then arrange blood tests in 3 months.
- ***The diagnosis on Discharge letter should read "Maternal blood borne infection"***
- Refer to BBI specialist paediatrician

Herpes Simplex Infection

See Management of Neonatal Herpes simplex Infection Guideline available on BadgerNet for specific guidance on management of baby's at risk of this infection.

Neonatal herpes can be acquired during delivery and occurs secondary to maternal genital herpes in 85% of cases (this maybe asymptomatic maternal infection). The incidence of neonatal HSV born to mothers with active herpes is estimated at 50%. There are four presentations:

- Localised (skin, mouth, eyes)
- Generalised (liver, adrenals, lungs, brain)
- Pneumonitis
- Meningoencephalitis

Infants are at increased risk if the mother has primary active herpes and they were delivered vaginally or by LSCS after rupture of membranes. If the mother has recurrent herpes the risk to the baby is significantly reduced. The presence of active lesions at the time of delivery is of importance.

Chickenpox

Varicella (chicken pox) is the primary infection with Varicella Zoster Virus (VZV). The incubation period is 14-21 days. Chickenpox can have potentially life-threatening complications like pneumonia, hepatitis, encephalitis, maternal death, foetal varicella syndrome and varicella infection of newborn. If a woman develops chickenpox in the first 28 weeks of pregnancy, she has a small risk of developing foetal varicella syndrome and this should have been discussed with her.

Women who have developed chickenpox in pregnancy should have been referred to a foetal medicine specialist at 16-20 weeks or 5 weeks after infection for detailed ultrasound Examination of the fetus and discussion. Please review the results of any such imaging. The mother may have undergone an aminocentesis to detect varicella DNA in the amniotic fluid and this result if available should be discussed with a virologist.

The highest risk to the baby of contracting chicken pox in the newborn period occurs in the last rimester of pregnancy. Ideally, a minimum of 7 days should elapse between onset of rash and delivery providing continuing the pregnancy does not pose any additional risk to mother or baby. The baby is at high risk of varicella infection which has significant morbidity and mortality. The risk of acquiring this is highest if maternal infection occurs in the last 4 weeks of a woman's pregnancy.

Any baby who has been exposed in this scenario should have their management discussed with the virology consultant and the attending neonatal consultant. It likely that those infants most at risk will require:

- Testing for Varicella and their immunological response to potential exposure
- Aciclovir while awaiting results of virology testing
- Varicella immunoglobulin to decrease the impact of any potential infection
- Source Isolation from other babies and mothers

Please see Maternity Guideline ‘Chicken pox in pregnancy available through Insight’

Mothers who have tested positive for Syphilis in Pregnancy
(Refer to Syphilis Guideline)

- Babies at risk should have been highlighted through the foetal alert system and a management plan proposed.
- Bloods to be taken prior to discharge 1 ml white top bottle
- Test requested “Treponemal Serology”
- Clinical Details “Maternal blood borne disease”

Under no circumstance should Mum be documented as having “Syphilis” on forms or in Red book

Antenatal Parental Concerns

Antenatal maternal concerns include:

- Maternal/Paternal drug or alcohol abuse
- Previous concern regarding safeguarding issues
- Social Service concerns

These babies should have been highlighted antenatally through an 'A form' and a foetal alert may be available on the shared drive with details of a postnatal plan for mother and baby. It is important that the attending Consultant is made aware of these concerns and that the situation is discussed with the Social Services via the hospital safeguarding team before discharge is agreed. A planning meeting may need to be arranged prior to discharge.

If you have new safeguarding concerns that become apparent postnatally which have not been highlighted in pregnancy these must be raised via the hospital safeguarding team verbally and followed up in writing by completion of an A form.

Further details are available via Insight:

http://insitetogether.xuhl-tr.nhs.uk/Divisions/Corporate/Safeguarding-Children/Pages/default.aspx

Maternal Substance Misuse

Key Points:

1. A paediatric alert form should have been completed on each mother where there is known, habitual substance misuse and who are under the care of the specialist midwife for substance misuse. This should be sent to the neonatal unit and a copy filed in the patient's hospital notes.

2. It is important to note the results of antenatal serology testing and social circumstances as well as the drugs and dosages to which the fetus was exposed during pregnancy

3. Infants should be managed on the postnatal wards where at all possible

4. All **at risk** infants should remain in hospital for at least 72 hours of observation following birth This **does not** apply for mothers and babies where there are no ongoing concerns about substance misuse e.g. those who may have used in the past, but are not doing so currently.

5. Little is known about NAS in preterm babies and responses are likely to be different from those in term infants. As yet there is no recognised method of identifying signs and symptoms or defining severity of withdrawal.

6. Note that there may be additional diagnoses in NAS infants – ***Do Not Assume all symptoms are due to withdrawal.***

7. If develops persistent symptoms of withdrawal despite conservative measures discuss with Neonatal Consultant further management. Very few babies require pharmacological intervention.

Narcan (Naloxone) must not be given to infants of drug (opiate) abusers as it may precipitate seizures

Please see Substance Misuse in Pregnancy Guideline available on Insight via Women's for further details**.**

Maternal Antidepressant Use

Please see associated network guideline
Observe for at least 24 hours for signs of withdrawal and make sure pulse oximetry screening is completed.

Maternal Prescribed Medication and Breast Feeding

Some prescribed medications may have implications for breastfeeding predominantly cytotoxic drugs. Up to date information on the amount of drug bioavailable in milk and signs and symptoms of toxicity in the infant are available via the UK Drugs in lactation advisory service (UKDILAS)

UKDILAS is available during the centres' main opening hours - 09:00 am until 17.00 pm, Monday to Friday, excluding Bank Holidays.
To contact the service:

- Telephone: 0116 258 6491 or 0121 424 7298

We should encourage and actively support breast feeding. There are very few medications which taken would completely contraindicate breast feeding. A mother should NOT be told that breast feeding is contraindicated until all the facts about her treatment are known and while this information is obtained she should be supported to express her milk so as not to adversely affect her milk supply.

Skin concerns

There are many skin rashes and marks that occur in the early neonatal period. Most of these are benign and do not cause significant concerns

Skin tags

Pre auricular skin tags.

- Ensure has screening audiology before discharge
- Consider referral to Plastic Surgeon if significant

Paronychia

This is infection of the nail bed and is potentially serious.

- Culture affected area.
- Give 5 days of oral flucloxacillin
- If infant unwell admit for infection screen and use systemic antibiotics.

Umbilical discharge with periumbilical flare

- Swab affected area
- Consider giving 5 days of oral flucloxacillin or 48 hours of IV antibiotics followed by oral antibiotics to complete a 5 day course if systemically unwell

Umbilical Granulomas

Please see:
https://www.leicspart.nhs.uk/Library/292UmbilicalGranuloma.pdf

Erythema toxicum

Also known as erythema neonatorum or neonatal urticaria. This is of no clinical significance. It consists of tiny "pustules" containing eosinophils surrounded by polygonal areas of erythema. They are most common on the trunk and rather rare on the limbs and appear about the second day of life, peak at 4 days and then subside.

Other Neonatal Skin conditions

Transient Vascular Phenomena

Cutis Marmorata

Cutis marmorata is a reticulated mottling of the skin that symmetrically involves the trunk and extremities. It is caused by a vascular response to cold and generally resolves when the skin is warmed. A tendency to cutis marmorata may persist for several weeks or months, or sometimes into early childhood. No treatment is indicated.

Harlequin Colour Change

Harlequin colour change occurs when the newborn lies on his or her side. It consists of erythema of the dependent side of the body with simultaneous blanching of the contralateral side. The colour change develops suddenly and persists for 30 seconds to 20 minutes. It resolves with increased muscle activity or crying. This phenomenon affects up to 10 percent of full-term infants, but it often goes unnoticed because the infant is bundled. It occurs most commonly during the second to fifth day of life and may continue for up to three weeks. Harlequin colour change is thought to be caused by immaturity of the hypothalamic centre that controls the dilation of peripheral blood vessels.

Transient Neonatal Pustular Melanosis

Transient neonatal pustular melanosis is a vesiculopustular rash that occurs in 5 percent of black newborns, but in less than 1 percent of white newborns. In contrast with erythema toxicum neonatorum, the lesions of transient neonatal pustular melanosis lack surrounding erythema. In addition, these lesions rupture easily, leaving a pigmented macule that fades over three to four weeks. All areas of the body may be affected, including palms and soles.

Clinical recognition of transient neonatal pustular melanosis can help doctors avoid unnecessary diagnostic testing and treatment for infectious aetiologies. The pigmented macules within the vesicopustules are unique to this condition; these macules do not occur in any of the infectious rashes. Gram staining of the pustular contents will show polymorphic neutrophils and, occasionally, eosinophils.

Acne Neonatorum

Acne neonatorum occurs in up to 20 percent of newborns. It typically consists of closed comedones on the forehead, nose, and cheeks, although other locations are possible. Open

comedones, inflammatory papules, and pustules can also develop. No treatment is usually necessary.

Milia

Milia are 1- to 2-mm pearly white or yellow papules caused by retention of keratin within the dermis. They occur in up to 50 percent of newborn. Milia occur most often on the forehead, cheeks, nose, and chin, but they may also occur on the upper trunk, limbs, penis, or mucous membranes. Milia disappear spontaneously, usually within the first month of life, although they may persist into the second or third month.

Blue Spots

Very common and of no clinical significance other than the importance of clear documentation on the body map in the red book to ensure they are not mistaken for bruises after discharge.

Sticky Eyes

The naso-lachrymal duct may not canalise completely until after 6 months of age and this leads to poor drainage of tears and sticky eyes. In these cases regular cleaning with sterile (boiled and cooled) water may be appropriate.

If there is a purulent discharge:

- Only swab (gram stain and culture, chlamydia (special container)) if treating with topical antibiotics
- Start Chloramphenicol treatment
- If Gonococcus is seen start systemic penicillin and review sensitivities
- If Chlamydia is diagnosed treat with tetracycline drops and oral erythromycin for 10 days
- In the case of gonococcus or Chlamydia the mother should be seen in referred to the GU clinic
- **DO NOT SWAB AND WAIT FOR RESULTS**

Coagulation concerns

Haematemesis

This may occur soon after delivery and is usually due to swallowed maternal blood. If bleeding is not considered to be maternal do the following:

- Admit infant to the neonatal unit
- Perform following investigations
    - FBC / clotting studies / group and X-match (fresh blood).
    - Give Vit K if not previously administered by IM route.

Rectal Bleeding

Some babies have a little fresh blood in their stools usually from an anal fissure and malaena may represent swallowed maternal blood or bleeding from higher up the GI tract:

Following review if clinical concern about the baby:

- Admit infant to the neonatal unit
- Consider Surgical Cause

- Also consider cows milk allergy / lactose intolerance / meckel's diverticulum.

If there is profuse bleeding:

- Refer to Paediatric Surgeon
- Do the following investigations:
    - FBC / clotting studies / group and X-match (fresh blood).
    - Give Vit K if not previously administered by IM route.

NEC can present in term babies and should be included as a differential diagnosis in any baby who is in any way unwell.

Haemoglobinopathies

Babies born to parents who have known carrier status for the common haemoglobinopathies should have a foetal alert with a plan of care with regard to post-natal testing outlined within.

Electrophoresis: 1 EDTA sample drawn on day 1 if paediatric alert received by SCAT team (Special Haematology, Email link person, Letter to SCAT team, LRI)

Criteria for referral to Home Care Team

Any babies resident in Leicestershire or Rutland fitting one or more of the criteria below

AND being followed up by a neonatal consultant

- Babies born at <32/40.
- Corrected gestation of <35/40 at discharge.
- Requirement for home oxygen.
- Discharged home on naso-gastric tube feeds / feeds not well established at breast.
- Discharge weight of less than 2kg.
- Major congenital anomaly.
- Confirmed seizure activity or HIE grade 2 or above.
- Referral from a neonatal consultant.
- Requirement for surgical / medical procedure i.e distal loop washout, dressing change etc.
- Repeat Guthrie – NB these babies may not be being followed up by neonatal consultant.
- Bereavement and Palliative care – discharge planning will be facilitated by Neonatal Outreach. Following this there will be a joint / handover visit with the HV and

community teams involved with ongoing care e.g. Diana nurses.

- Significant social / safeguarding concerns – discharge planning will be facilitated by Neonatal Outreach. Following this care will be handed over to health visitors and social care team.

This list is not exhaustive and not all babies requiring follow up will fit into the criteria. The team are happy to discuss any infants that do not fit into the above criteria.

Appendix 1: BadgerNet admission and ICE letter Eligibility

Badger Eligibility

BABIES FROM BIRTH

Babies < 35 +6/40

Birth weight > 1600 g and ,<2000g

RISK FACTOR FOR SEPSIS REQUIRING ABX-CLINICCALLY STABLE

Any baby requiring phototherapy at any time
(if within 24 hrs and no maternal antibodies baby will also need a PSS)
Babies with an A/N plan of requiring a PN echo as inpatient

ADDITIONAL CARE NEEDS DEVELOPING ON THE PN WARD

Inability to maintain temperature following a period of rewarming
A stable baby who has developed or been identifed as having risk factors for sepsis requiting ABX within 24 hrs
Baby with heart murmur needing an ECG as inpatient
Significant NAS babies requiring oral medication and feeding support
Bilateral undescended testis
Excessive weight loss

NNU TRANSFER TO TCU(PN Ward)

Corrected gestational age> 33+0 and clinically stable
Current weight > 1600g and maintaining temperature
Monitoring of vital signs required no more frequently than 4 hourly
Stable baby with sepsis requiring ongoing AbX
Continuing phototherapy when serum bilirubin has stablised following IV or exchange transfusion
Palliative care when parent / carer is doing most of the care

ICE ELIGIBILITY

Babies 36+0 to 36+6 requiring prefeed blood sugars and 24 hrs of observation
Breech/clicky hips
Congenital abnormalities
Babies with paediatric alert requiring outpatient follow up and GP letter
Unilateral undescended testis /Hydrocoele/Natal teeth/Opthalomology
Extra Digits /surgical referrals/Renal/Cardiology if no in patient plan (family history)
Hypospadias/Fixed talipes/ Babies with a paediatric alert for BBI –(hep B, HIV)
NAS babies – document daily in maternal notes on the PAED page and daily ICE updates

" A term, well baby requiring prefeed blood sugars does not need ICE or badger admission if no further follow up is required 2

Babies only require Green TCU notes if they are on antibiotic / Inpatient USS
Have an heart murmur requiring an ECG/Inpatient PN ECHO/have transferred to PN ward from NNU
Manilla notes ONLY for babies requiring Consultant follow up
Patient centre Speciality to be changed on all BADGER and ICE babies and ALL notes to be tracked to ward
For jaundice babies > 24 hrs document on NEWS/Jaundice Chart and file the maternal notes on PAED page – no notes needed)

A COPY OF THE ICE?BADGER ADMISSION DISCHARGE MUST BE FILED IN THE NOTES
(BABY AND MATERNAL) AS REQUIRED AND A COPY OF THE DISCHARGE LETTER GIVEN TO THEW PARENTS PRIOR TO DISCHARGE

Monitoring requirements:

	Monitoring
Process for monitoring:	Retrospective case note review
How often will monitoring take place:	Quarterly
Population:	0.5% of all health records of newborns
Person responsible for monitoring:	Senior midwives for Intrapartum Services
Auditable standards:	• All newborn babies have a full newborn assessment by a midwife or paediatrician as soon as possible after birth • The newborn assessment is documented within the mother's Intrapartum notes • Where there are suspected deviations from the norm, these are referred to the neonatal team for further assessment, investigation or treatment
Results reported to:	Maternity Governance Group Neonatal Q&S Group
Action plan to be signed off by:	Maternity Governance Group Neonatal Q&S Group
Person responsible for completion of action plan:	Senior midwives for Intrapartum Services

Guideline development:

September 2008	Guideline originally written by V Kairamkonda, Consultant Neonatologist.
September 2011	Review by E Boyle, Consultant Neonatologist
September 2015	Review by J Behrsin, Consultant Neonatologist
Jan 2020	Neonatal Guideline Meeting
Jan 2020	Neonatal Governance Meeting