

Trust Guideline for the Newborn and Infant Physical Examination (NIPE)

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Distribution Control

Printed copies of this document should be considered out of date. The most up to date version is available from the Trust Intranet.

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Consultation

The following were consulted during the development of this document:

- Medical, Nursing and Midwifery colleagues in Division 3,
- Neonatal Consultants
- Advanced Neonatal Practitioners
- Antenatal and Newborn Screening Coordinator
- Ophthalmology Consultant
- Radiology Consultant
- Orthopaedic Consultant

Monitoring and Review of Procedural Document

The document owner is responsible for monitoring and reviewing the effectiveness of this Procedural Document. This review is continuous however as a minimum will be achieved at the point this procedural document requires a review e.g. changes in legislation, findings from incidents or document expiry.

Relationship of this document to other procedural documents

This document is a clinical guideline applicable to the Norfolk and Norwich Hospital please refer to local Trust's procedural documents for further guidance, as noted in Section 5.

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1. Introduction

1.1. Rationale

All newborn infants require a medical examination before discharge. Abnormalities may have already been detected by antenatal investigations, and these infants will be identified by the '*Neonatal Alert*' system. Other abnormalities will either be identified by the parents, midwife or later by the newborn examiner. This guideline will give guidance to the newborn examiner with regard to follow-up or referral if necessary, based on the evidence available.

1.2. Objective

To ensure early identification of any abnormalities and to facilitate appropriate and timely referral where necessary.

1.3. Scope

The purpose of document is to provide direction and information to staff involved in the NIPE process. The scope of the document covers patients who require NIPE at the Norfolk and Norwich Hospital. This guideline should be reviewed by all medical staff and implemented to prevent incidents occurring.

1.4. Glossary

The following terms and abbreviations have been used within this document:

Term	Definition
ANNP	Advanced Neonatal Practitioner
CHD	Congenital Heart Disease
CVS	Cardiovascular System
KPI	Key Performance Indicator
MNE	Midwife Neonatal Examiner
NIPE	Newborn Infant Physical Examination
S4N	Smart 4 NIPE

2. Responsibilities

All health care professionals to fully comply with this guideline to ensure timely review and management of results.

3. Policy Principles

3.1. Broad recommendations

NIPE newborn examination should take place between 4 and 72 hours of age (See Appendix 3- NIPE within 72 hours failsafe Pathway). It is considered safer to undertake the NIPE newborn examination early with the potential for more false positives, rather than risk missing screening altogether.

In the case of early transfer home, babies should still be offered a NIPE newborn examination and the need for this should be communicated to the appropriate clinician at handover. Ideally, the examination should take place in hospital before transfer home. If this does not happen before transfer, there must be a robust local follow-up pathway to ensure it takes place within 72 hours of age. This could be by

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return to a designated NIPE clinic or arrangements being made for the examination to take place in the community/primary care setting.

It is the responsibility of the maternity service providing care to ensure the NIPE newborn examination is provided for babies born at home.

When documenting the examination care should be taken to identify the correct infant by cross referencing their name, date of birth, NHS number and maternal details therefore ensuring the correct record is being accessed.

3.2. Failsafing the Smart4NIPE System

It is the daily responsibility of the designated member of staff on 'Baby Checks' located on Blakeney to ensure all babies who are due their NIPE in all areas of neonatal and maternity services are offered this examination within the 72-hour timeframe (See Appendix 4- NIPE Daily Failsafe Responsibility by Practitioner Pathway). This is achieved by accessing and monitoring the Smart4NIPE System.

In addition to this, the Antenatal and Newborn Screening Team will check the S4N system daily (Monday- Friday) to failsafe this process and ensure any identified babies who have breached or are going to breach are recalled immediately.

The Antenatal and Newborn Screening Team will provide NICU with a list daily (Monday-Friday) of all babies outstanding their NIPES who are residing on NICU. Each day at the huddle this list will be discussed, and any baby identified to be well enough to have their NIPE can be planned in for completion that day.

Any identified NIPE related incident must be reported via Datix, and the Antenatal and Newborn Screening Team informed (antenatal.newbornscreening@nnuh.nhs.uk).

4. Introduction

4.1. What is a NIPE?

The NHS Newborn and Infant Physical Examination Screening Programme (NIPE) sets standards to ensure all parents are offered the opportunity of a head-to-toe physical examination for their baby. This examination is to check for problems or abnormalities within 72 hours of birth and again between six and eight weeks this examination take place in a community setting (usually by the GP) between 6 and 8 weeks of age, (however this document only covers the initial check). It includes a general all over physical examination, as well as specific screening elements which involve examination of the baby's eyes, heart, hips and testes. Documentation of the NIPE should take place on the NIPE Smart system, a national computerised database.

NHSE set key performance indicators (KPI) and Standards for identified abnormalities when performing a NIPE which specify the timeframes from identification to review by a specialist. This ensures prompt review is achieved and risk of long-term harm is reduced. The KPIs and Standards are national standards and detailed within this document.

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Prevalence of conditions
• Heart – around 1 in 200 babies may have a heart problem
• Hips – about 1 or 2 in 1,000 babies have hip problems that require treatment
• Eyes – about 2 or 3 in 10,000 babies have problems with their eyes that require treatment
• Testes – about 1 in 100 baby boys have problems with their testes that require treatment

A comprehensive and skilled systemic examination of the newborn infant is an important part of routine care. Knowledge of normal and abnormal is essential so that conditions requiring more detailed assessment or treatment can be identified.

The examination should include a review of parental concerns and the infant's medical history should be evaluated to include an assessment of family, maternal, antenatal and perinatal history and an assessment of fetal and neonatal well-being. Knowledge of gestational age and appropriate growth patterns assist in identifying potential risks to the neonate.

The routine examination will be carried out in a safe, warm, well-lit environment. Privacy should be provided particularly when discussing family health issues of a sensitive nature.

The examiner should allow sufficient time for an unhurried examination which includes discussing findings with the parents, referral if necessary and completing the relevant documentation. The NIPE smart system will automatically generate a completed newborn examination proforma which must be given to parents to file in their child health record ('red book') by either the Midwifery Neonatal Examiner or the Neonatal team. A copy of this also must be filed in baby's medical notes and accompany the Badger discharge summary at the time of discharge.

4.2. Screen positive on NIPE

4.2.1. Heart screen positive

Senior paediatrician review (urgency depends on suspected condition) but review is recommended before discharge home. Bleep number #1377 (9-5pm) after 5pm and overnight bleep #1060.

4.2.2. NHSE NIPE Performance Thresholds

The below table specifies the NHSE KPIs relating to NIPE and required national performance threshold that we must achieve.

Screen Positive	KPI Standard	Timeframe assessment outcome	for and	KPI Performance Threshold
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NIPE Coverage	<u>NIPE- SO1:</u> NIPE coverage- screening completed within 72 hours	The proportion of babies eligible for the newborn physical examination who are tested for all 4 components (3 components in female infants) of the newborn examination at ≤ 72 hours of age Eligibility: Screening may be delayed where a clinical decision is made because the baby is ‘too young’ or ‘too ill’ for NIPE newborn screening. ‘Too young’ is defined as babies born < 34 weeks gestation. Screening may be delayed until these babies reach ≥ 34 weeks and zero days (34 ⁺⁰) gestation. ‘Too ill’ screening should be completed as and when the baby’s condition allows	<div style="background-color: #FFD700; padding: 2px;">Acceptable level: ≥ 95.0%</div> <div style="background-color: #90EE90; padding: 2px; margin-top: 5px;">Achievable level: ≥ 97.5%</div>
Eye screen positive	<u>NIPE-SO2:</u> Timely intervention: eye abnormality seen within 2 weeks	Number of babies with a screen positive eye result on newborn physical examination who attend for clinical assessment by an ophthalmology specialist ≤ 2 weeks of the examination.	<div style="background-color: #FFD700; padding: 2px;">Acceptable level: ≥ 95.0%</div> <div style="background-color: #90EE90; padding: 2px; margin-top: 5px;">Achievable level: ≥ 99.0%</div>
Hip screen positive (abnormal clinical hip examination) / Presence of hip risk factors	<u>NIPE-SO3:</u> Diagnosis/intervention - timeliness of ultrasound scan of the hips for development dysplasia	Hip ultrasound for babies with abnormal findings/risk factors within 4-6 weeks of age (40 weeks corrected age if born <34 weeks gestational age)	<div style="background-color: #FFD700; padding: 2px;">Acceptable level: ≥ 90.0%</div> <div style="background-color: #90EE90; padding: 2px; margin-top: 5px;">Achievable level: ≥ 95.0%</div>
The proportion of	<u>NIPE-SO4:</u> Diagnosis/intervention	Timeliness of clinical assessment or	To be set

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babies with a screen positive newborn hip result at newborn physical examination for whom an outcome decision was made within the designated timescale	- timeliness of hip clinical assessment or discharge	discharge. Specialist orthopaedic appointment by 6 weeks of birth or 40 weeks corrected age if born < 34 weeks gestation age	
Bilateral undescended testes	<u>NIPE- SO5:</u> Diagnosis/intervention - timeliness of intervention for bilateral	Timely intervention: bilateral undescended Testes; review within 24 hours by Consultant Paediatrician/Associate Specialist	Achievable 100%

4.3. Babies in neonatal units

Babies in neonatal units should be assessed and if well enough the NIPE screen should take place within 72 hours of age.

Some babies in neonatal units may be too ill at the time the examination is due and the NIPE screen is not appropriate. If possible, all screening elements should be undertaken but, if not, each element of the NIPE screen should be completed as soon as practicable.

Some elements of the NIPE screen may need to be repeated in very preterm babies (for example, eyes) but referrals should still be made as per national standards regarding screen positive cases.

Referral timescales should not be age adjusted for preterm babies.

Babies less than 31 weeks gestational age (up to 30 weeks and 6 days) or less than 1500g birthweight should be screened for retinopathy of prematurity (ROP).

4.4. Who should examine which baby?

Neonatal team	NIPE Trained midwife
<p>< 36 weeks gestation: Nasogastric tube feeds. Significant antenatal congenital anomalies. Babies on a treatment course of</p>	<p>All others including: 'Well babies' to include those: - Mothers have GBS risk factors. - Mothers are diabetic. - Having routine blood sugar monitoring.</p>

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<p>antibiotics. Babies with a birthweight <2.2kg.</p>	<ul style="list-style-type: none">- On 48 hours prophylactic iv antibiotics for maternal risk factors- Born through meconium- Born where the ruptured membrane interval exceeds 18hrs- With a sibling or parent with a cardiac anomaly (if current anomaly scan/ fetal echocardiogram normal) <p>Maternal 'safeguarding' record – where these are for information only</p> <p>If any concerns, midwives should discuss with neonatal team.</p>
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4.5. Referral pathways and documentation

- Any concerns that the practitioner has after examining the neonate should be referred to an appropriate neonatal senior middle grade colleague or consultant.
- Pathways for onward referral to other departments are identified under each relevant section of this guideline.

A 'Higher Needs' form should be completed (available on Blakeney and Delivery Suite) and a set of hospital notes (buff folder) made up for any infant where findings deviate from normal in any respect. For specific issues highlighted on the NIPE for the four areas of national screening, documents will be automatically generated when the NIPE findings sheet is printed.

The findings of the examination should be documented within the neonatal notes (on higher needs form) and on the NIPE SMART system with copies printed and placed in the Child Health Record (red book) and neonatal notes.

4.6. Communication with Parents

Prior to performing the examination, the purpose and procedure followed should be fully explained to the parents, verbal consent obtained, and a written information leaflet provided.

After completion of the examination:

- The findings of the examination should be discussed with the parents and any questions/queries answered (even for a normal examination)
- If any deviation from the normal is detected and referral to another specialty is indicated, the parents should be given a full explanation of the abnormality, the reason for and time scale of the referral. If any abnormality is found in any of the four specific screening elements of the NIPE (eyes, heart, hips and testes) an automatic referral letter will be generated by the system.

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5. NIPE Examinations by System

5.1. Skin Assessment

Note the colour, perfusion, texture, tone and turgor and the presence of birthmarks. Presence of birthmarks to be documented on NIPE SMART (S4N).

Common normal variations (no treatment required):

Superficial peeling: often seen, particularly post term.

Acrocyanosis (bluish discoloration of hands and feet): benign, exacerbated by low temperature.

Circumoral cyanosis (bluish discoloration around the mouth): as above.

Erythema toxicum neonatorum (small white/yellow papules or vesicles with erythematous base): benign, can be found anywhere on the body. Can be present for up to 2 weeks after delivery.

Epstein's pearls and milia (epidermal cysts caused by blocked sebaceous gland secretions): Epstein's pearls can be found in mouth and penis, milia on nose. Resolve spontaneously.

Lanugo: fine hair.

Vernix caseosa: a waxy or [cheese](#)-like white substance found coating the [skin](#)

Mild jaundice: normally physiological between day 3-5. For more significant jaundice see separate guideline.

Bruising: usually due to birth trauma. If extensive or purpuric seek further advice.

Hyperpigmented lesions: due to abnormal development of melanin cells. Hyperpigmented macule (Mongolian blue spot) is the commonest lesion seen in 90% of Asian, Hispanic and African origin infants and up to 10% Caucasian infants).

Sucking blisters: often seen on lips and fingers.

Neonatal pustular melanosis: a cutaneous condition that presents at birth with 1 to 3mm flaccid, superficial fragile [pustules](#), some of which may have already resolved in-utero, leaving pigmented [macules](#). #

5.2. Abnormalities

Jaundice: if <24 hours of age manage as pathological jaundice (see NICE guideline).

Cyanosis: if central consider cardiac anomalies.

Pallor: may indicate shocked baby or anaemia. Investigate as appropriate.

Plethora (purplish hue): may need further investigation for possible polycythaemia, including haemoglobin (Hb) and haematocrit.

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Cutis aplasia: an uncommon congenital abnormality in which layers of the skin are absent. Can occur anywhere but most common on scalp. Seek senior advice.

Pustular skin rashes: seek senior advice.

Vesicular and blistering lesions: seek senior advice.

5.3. Birth Marks

Naevus simplex (stork marks): superficial capillary naevi seen on eyelids, forehead or nape of neck. Reassure the parents.

Superficial cavernous haemangioma (strawberry naevus): usually bright red raised and sharply defined. Appears within the first week, increases in size until 6 months of age, after which time it regresses.

Capillary haemangioma (port wine stain): larger and darker than naevus simplex. Can be anywhere on body, frequently on face. May be associated with intracranial vascular anomalies (Sturge-Weber syndrome). Seek senior advice.

Café au lait spots: often seen in axillae and viscera. If they are larger than 3cm in size or greater than 6 in number, consider cutaneous neurofibromatosis. Seek senior advice.

6. Head Assessment

Fontanelles are areas where at least 3 bony plates of the skull meet. The posterior fontanelle should be less than 5mm and closes shortly after birth. The anterior measures 10-50mm and may not close until 18 months. The anterior fontanelle should neither bulge nor be sunken. It can bulge when the baby cries. A tense or bulging anterior fontanelle can indicate raised intracranial pressure.

Sutures are gaps between 2 bony plates of the skull. These may be easily palpable at birth. Premature fusion of the sutures (**craniosynostosis**) may be palpable as a prominent edge, but this may also be overriding sutures. Overriding sutures tends to present as a step up feel.

Craniosynostosis needs a middle grade review then onward referral to the craniofacial unit at Great Ormond Street Hospital.

Overriding sutures resolve with time and parental reassurance is needed.

Head shape - the scalp is relatively easily traumatised and swelling, bruising and moulding is common.

Brachycephaly is shortness in the anteroposterior diameter of the skull and can be linked to syndromes such as Trisomy 21

Plagiocephaly: flattening of one side of the head. No action required.

Oxycephaly (turricephaly) is when the head forms a pointed shape.

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Caput succedaneum - scalp oedema caused by pressure over the presenting part. This oedema may cross suture lines and is often accompanied by bruising and petechia. This is a benign finding that will resolve fairly quickly.

Bruises and swelling are common responses to trauma and will resolve with time. Be aware that the bruises may contribute to jaundice.

Birth injuries are bruises, lacerations or lesions from amniotic hook, fetal scalp electrode, ventouse cap or forceps. Suturing may sometimes be required. Observe for signs of infection.

Cephalhaematoma - accumulation of blood below the periosteum which is contained within suture lines and may be unilateral or bilateral. More commonly found with forceps or vacuum assisted delivery. It will resolve spontaneously, though may lead to jaundice.

Subaponeurotic haematoma is a rapidly developing swelling that crosses the suture lines and often presents with signs of hypovolaemic shock. Babies should be transferred to NICU for immediate assessment.

Head Size: Note the occipito-frontal circumference (OFC). The normal range for a term baby is 32-37cm.

Macrocephaly: >90th percentile on growth chart. This may be familial or moulding. Also linked to subaponeurotic haematoma and hydrocephalus. A large head with widely separated sutures may need an immediate ultrasound.

Microcephaly: <10th percentile on growth chart. Cause may be chromosomal, metabolic, congenital infection or an isolated microcephaly. Seek senior neonatal advice for any abnormalities.

7. Ear Assessment:

Look at the general **shape, size and position** of the ears and feel the cartilage.

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7.1. Low set ears

In normally placed ears the top of the helix lies on a line drawn at right angles to the facial profile from the outer canthus of the eye.

7.2. Abnormal formation or placement

Abnormal formation or placement can be associated with chromosomal anomalies or syndromes.

7.3. Pre-auricular tags are epithelial mounds or pedunculated skin tags

Pre-auricular tags are epithelial mounds or pedunculated skin tags that arise near the front of the ear around the tragus. They have no bony, cartilaginous, or cystic components and do not communicate to the ear canal or middle ear. They can be familial and are of cosmetic importance only. Referral to plastic surgeons should be offered to parents.

7.4. Pre-auricular sinuses

Pre-auricular sinuses should be referred to the ear, nose and throat surgeons (ENT) as surgery may be required and multiple infections are likely.

8. Facial Assessment:

An unusual facial appearance is often the first clue to an underlying disorder. Therefore, this should prompt a particularly diligent search for other dysmorphic manifestations.

Asymmetry of the face may be the result of the baby lying awkwardly in-utero, but it can occur with other syndromes. It may also be a sign of hemihypertrophy (enlargement of one side of the body), which can be associated with nephroblastoma and therefore should be seen by a senior colleague who may consider a renal ultrasound.

Asymmetry can also be caused by facial nerve paralysis, with inability to close the eye, and inability to move lips on the affected side. Newborns with facial nerve palsy have difficulty achieving a seal around the nipple and consequently exhibit drooling of milk from the paralysed side of the mouth.

Most **facial nerve palsies** resolve spontaneously within days, although full recovery may require weeks to months. Examine carefully for other cranial nerve palsies, paediatric follow up will be required.

A small jaw may be familial or may occur as part of a syndrome such as Pierre-Robin. Look for an associated cleft palate. Will need senior review.

Dysmorphic facies (expressions) are usually familial, so always look at the parents. If you suspect a syndrome, seek senior advice who may consider chromosomal analysis or geneticist referral.

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9. Eye Assessment

For any baby identified as requiring referral for an eye abnormality, please follow the NIPE Neonatal Eye Referral Pathway (Appendix 5).

Before the examination practitioners should establish baby's family history (childhood eye disorders, particularly congenital cataract and retinoblastoma).

- Bilateral examination.
- Bilateral examination covers:
- Eye opening – presence of eyes.
- Position and symmetry.
- Size and colour.
- Presence of red reflex (a reflection from the back of the eye that is similar to the red eye effect sometimes seen in flash photography).
- If no red reflex, or a weak red reflex, is seen, it may mean there is cloudiness in the lens.

You should be able to elicit a red reflex by illuminating the eye with the ophthalmoscope.

Look at the contour, slant and position of the eyelid's aperture in relation to the nose bridge. Observe the size of the eye, the clarity of the cornea, the shape and position of the pupil. The sclera should be white. If yellow, consider jaundice. If blue, consider osteogenesis imperfecta. Haemorrhages are common.

Eye discharge is common in neonates but can be caused by infection (conjunctivitis) and blockage of the lachrymal duct.

If the discharge is abundant or there is associated erythema or swelling, consider swabbing and chloramphenicol ointment (more effective than drops as they remain in contact with the eye for longer). Once organism identified; specific treatment for **ophthalmia neonatorum** can be instituted. Systemic complications like rhinitis, otitis and pneumonitis are not common but should be noted.

The cornea should be clear. A white corneal opacity with conjunctivitis indicates keratitis which is rare but serious and should generate an urgent opinion from ophthalmology.

- **Gonococcal** infection is a hyperacute infection 1-3 days in association with peri-orbital oedema. Intensive treatment is required for both eyes.
- **Staphylococcal** conjunctivitis occurs at 2-5 days and is less severe.
- **Chlamydial** infection occurs at 4-28 days.

Florid conjunctivitis associated with peri-orbital swelling suggestive of orbital cellulitis must be treated with systemic antibiotics since the risk of infection spreading into the cranial cavity is high.

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A **blocked lachrymal duct** will usually resolve with time. GP should be advised to refer to Ophthalmology if symptoms persist beyond 9 months of age.

Squints are common and intermittent, and usually correct themselves within 6 months. If squint remains fixed parents should be advised to contact their general practitioner (GP). Epicanthic folds or a broad nasal bridge often give the appearance of a squint.

Epicanthic folds are a normal finding in Down's syndrome.

NIPE SMART will automatically generate a referral letter to the consultant ophthalmologist if follow up is required. If urgent please contact the ophthalmology team through switchboard, otherwise fax/send letter via internal post:

The following conditions always require referral to Mr Narman Puvanachandra, Consultant Ophthalmologist, or Mr Anas Injarie Consultant Ophthalmologist on extension 4374.

Babies with an abnormality of the eye identified at the newborn examination should attend an assessment appointment by 2 weeks of age.

- **Family History Retinoblastoma** – Any baby with a close relative with retinoblastoma should prompt referral.
- **Congenital Dacryocystocele** a benign, bluish-gray mass in the inferomedial canthus that forms as a result of a narrowing or obstruction of the [nasolacrimal duct](#), usually during [prenatal development](#).
- Congenital Dacryosistitis is a serious infection of the lacrimal sac (medial canthal region) associated with swelling and redness and an ill baby. They will need to be distinguished from Dacrocele and treated with IV antibiotics
- **Ptosis** if a drooping eyelid covers part of the pupil.
- **Anophthalmia** (absence of the eye).
- **Microphthalmia** may occur as a result of congenital infection or as part of a syndrome. It will interfere with vision. Further investigations, including a congenital infection screen, should also be considered (discuss with senior neonatal colleague).
- **Macrophthalmia** A large eye commonly results from congenital glaucoma. The drainage of fluid is blocked leading to a build-up of pressure in the eye.
- **Coloboma** is a defect in one of the structures of the eye including eyelids, iris, retina, choroid and optic nerve.
- **Aniridia** (partial or total absence of the iris) isolated or in association with Wilms tumour, WAGR or Gillespie Syndrome.
- A **white reflex** rather than red occurs with congenital cataract, retinoblastoma (retinal tumour) or several other causes.
- A **cataract** is opacity of the lens which may or may not affect vision. They can be hereditary or attributable to congenital infection.

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10. The Nose

Look for clear nasal passages.

If **nasal flaring** is evident look for other signs of respiratory distress.

If **bilateral or unilateral choanal atresia** is suspected (respiratory distress, particularly while feeding) ensure a patent airway and refer to ENT surgeons, following senior review.

Snuffly noses are not uncommon and are not of concern if the baby is breathing and feeding well.

11. The Mouth

Inspect

- The tongue for size and tongue tie.
- The gums for cysts, clefts and neonatal teeth.
- The lips and palate for clefts. When examining the palate use a light source to observe in addition to feel.

11.1. Tongue tie (ankyloglossia)

The presence of a prominent frenulum does not equate to a need for tongue tie division. The only indication is when the infant is struggling to breast or bottle feed in the presence of an obvious tongue tie. The infant and mother need to be assessed by the breast-feeding link midwife or infant breast-feeding co-ordinator. Surgeons will not usually accept a direct referral from the neonatal team.

11.2. Neonatal teeth

Neonatal teeth are uncommon and if found should be referred to the orthodontic team as they may be loose and therefore inhaled.

11.3. A cleft lip and palate

A cleft lip and/or palate can usually be detected antenatally by routine ultrasound scans.

A cleft lip can be familial, occur as a result of chromosomal abnormalities or from maternal medication (e.g. phenytoin).

Half of all cleft cases involve both the lip and palate.

In all cases referral to the cleft team should be made urgently (contact details: 01223 596272 Fax: 01223 274244).

Please ensure that Cleft.Net.East is copied into all relevant patient correspondence including discharge letter and Echo results. These should be directed to Sandra Springer (secretary) who will pass this onto the Clinical nurse Specialist team, Dr Lucy Preston (lead Paediatrician) and the relevant cleft surgeon.

Cleft.Net.East, Box 46, Addenbrookes Hospital, Hills Road, Cambridge, CB2 0QQ

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Emails:

Sandra.springer@addenbrookes.nhs.uk, Lucy.preston@addenbrookes.nhs.uk

The suggested management and investigations outlined below is reproduced from the regional guideline.

11.4. Isolated cleft lip

- Standard postnatal examination (NIPE)
- Blood tests e.g., genomic microarray not usually indicated unless there are other concerns
- Consider genomic array and referral to genetics if there are any additional features suggestive of a syndromic cause (e.g., IUGR, dysmorphic features, other congenital anomalies, developmental delay) or if there is a family history
- Clinical photographs
- No echocardiogram if heart sounds clinically normal
- Basic life support training for parents
- Paediatric outpatient follow-up locally at 6-8 weeks of age to assess growth, if well no further paediatric appointments needed
- Surgery at around 3-6 months, follow-up by cleft multi-disciplinary team

11.5. Cleft lip and cleft palate

- Standard postnatal examination (NIPE)
- Nurse in lateral position unless otherwise indicated
- Senior paediatric assessment to assess for potential additional anomalies
- Blood tests e.g., genomic microarray not usually indicated unless there are other concerns or severe anomaly
- Consider genomic array and referral to genetics if there are any additional features suggestive of a syndromic cause (e.g. IUGR, dysmorphic features, other congenital anomalies, developmental delay) or if there is a family history
- Clinical photographs
- Referral to local audiology for regular follow-up after neonatal hearing screen
- Basic life support training for parents
- Pre-operative echocardiogram to be performed locally, if possible, otherwise contact Dr Wilf Kelsall to arrange in Cambridge
- Paediatric outpatient follow-up at 6-8 weeks, to assess growth, further follow-up as per clinical need
- Surgery for cleft lip around 3-4 months and palate from 6-9 months. Long term follow-up by cleft multi-disciplinary team only, unless other concerns

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11.6. Isolated cleft palate

- Examine for evidence of micrognathia/glossoptosis and/or airway obstruction.
- Nurse in lateral position unless otherwise indicated.
- Consider need for airway management if upper airway obstruction (UAO) present.
- If UAO present offer nil orally until assessed by Cleft Clinical Nurse Specialist; support with IV fluids/NG feeds as appropriate.
- Standard postnatal examination.
- Senior paediatric assessment to assess for potential additional anomalies.
- Genomic microarray (EDTA).
- Consider genetics referral as ~50% have a syndromic basis which may not be identified by genetic blood test (22q11DS will be identified by the array but some other associated syndromes will not be detected with this methodology).
- Referral to local audiology for regular follow-up after neonatal hearing screen.
- Basic life support training for parents.
- Pre-operative echocardiogram to be performed locally, if possible, otherwise contact Dr Wilf Kelsall to arrange in Cambridge.
- Paediatric outpatient follow-up at 6-8 weeks, to assess growth, further paediatric appointments needed at 6 and 12 months to assess development.
- Surgery for palate from 6-9 months. Surgery may be deferred in complex patients, please keep Cleft team informed of developments and associated conditions. Long term follow-up by cleft multi-disciplinary team only, unless other concerns.

12. The Neck

Seek senior neonatal advice for:

- Webbing of the neck is associated with Turner's syndrome.
- A shortened neck may be a result of vertebral anomalies such as Klippel-Feil syndrome (also includes decreased range of motion and low hairline).
- Abnormal swelling of the neck may result from a cystic hygroma (multicystic lesion) or tumour.
- Branchial cleft remnants are rare and occur when tissues in the neck and collarbone area fail to develop normally. They manifest as small pits, tags or lumps around the neck. They are prone to infection and will need surgical review.

13. Examination of the Newborn Chest and Respiratory System:

13.1. Risk Factors for respiratory disease:

- Prematurity.
- Delayed onset of breathing at birth or need for prolonged resuscitation.

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- History of viscid meconium noted in airway.
- Antenatal polyhydramnios.
- Major congenital malformations and syndromes.
- Predisposing factors for congenital infection (e.g., prolonged rupture of membranes, chorioamnionitis, offensive liquor, maternal fever in labour, fetal tachycardia in second stage).

13.2. Observation

Careful note should be taken during the first hour of life of:

- Colour
- Respiratory rate
- Presence of grunting or respiratory distress

In infants in the above risk categories or who have evidence of respiratory compromise observations should be repeated hourly for at least the first 4 hours of life.

13.3. Clinical Examination

13.3.1. Colour

Observe the colour of the baby's skin, lips and oral mucous membranes. In a normal neonate the lips and oral mucous membranes are pink and well perfused. Duskiness of the hands and feet ('acrocyanosis') is common in newborns and is normal within 48 hours of delivery.

13.3.2. Pallor

Consider poor perfusion, acidosis, anaemia, hypovolaemia.

13.3.3. Cyanosis

May be generalized or of lips, tongue, and mucous membranes. Indicates respiratory disease or congenital heart disease. If in doubt arrange for baby to have oxygen saturation (SaO₂) measured urgently on the neonatal unit. Normal post-ductal oxygen saturation is ≥95% in air.

13.3.4. Respiratory rate

It is important to observe the baby at rest. Count the baby's respiratory rate for a full minute. Normal respiratory rate in a newborn is 40-60 breaths per minute. A baby's rate will vary somewhat according to environment (for example is generally faster with increased environmental temperature). There may be substantial variation in the rhythm of baby's breathing pattern, with alternating periods of slower and faster breathing, particularly according to the baby's concurrent overall activity. Brief apnoeic pauses (up to 10 seconds) and sighs are quite normal, and also occur during normal sleep. Longer pauses in breathing are abnormal.

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13.3.5. Tachypnoea

Respiratory rate >60/min is abnormal. Consider possible respiratory disease, sepsis, heart failure, severe metabolic acidosis.

13.3.6. Apnoeas

Prolonged or frequent apnoeas are abnormal. Consider respiratory disease, sepsis, neurological abnormalities (e.g. seizures).

13.3.7. Grunting

Persistent expiratory grunting is always abnormal. Grunting occurs as the infant closes the glottis in an attempt to maintain an increased intrathoracic pressure in the face of alveolar collapse. Consider respiratory disease, sepsis, hypothermia, hypoglycaemia, acidosis.

13.3.8. Recession

Easiest to see if the baby is undressed. All inspiratory movements should normally be quiet and there should be no significant recession. In a normal infant there may be very minimal indrawing of the abdomen with inspiration (due to the relatively-compliant cartilaginous chest wall). Anything more than slight indrawing is abnormal. A baby with difficulty breathing will show recession of the lower costal margin, indrawing of the intercostal muscles between ribs with each breath, and sometimes also incession of the sternum with inspiration. Looking in the suprasternal notch, one may also note in a baby with respiratory distress that the trachea moves inwards with respiration - 'tracheal tug'. Nasal flaring may be noted immediately after birth but should settle quickly.

13.3.9. Auscultation

Place the stethoscope over all regions of the lungs – front, sides, back, and at the top and bottom in all areas. Normal breath sounds are soft and whispering. 'Gurgling' noises may be transmitted from the upper airway, especially if secretions are present. If breath sounds appear to be absent in any region, listen carefully for a longer period; the absence of breath sounds may indicate significant underlying pathology, e.g. collapse/ consolidation, pneumothorax, effusion, diaphragmatic hernia.

13.4. Other abnormal findings on observation that may signal an underlying/potential respiratory problem:

- **Excessive frothing/secretions or choking** Consider oesophageal atresia. Pass a nasogastric tube and check for an acid reaction with pH paper.
- **Prominent chest hyperexpansion/'barrel-shaped' chest** (increased antero-posterior diameter) - consider pneumothorax/aspiration syndrome/congenital diaphragmatic hernia
- **Cyanosis or breathlessness that improves with crying** – consider choanal atresia.
- **Scaphoid abdomen** - consider congenital diaphragmatic hernia

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13.5. Management of Newborns with Respiratory Problems

13.5.1. Acute cardio-respiratory collapse

All babies with acute cardio-respiratory collapse should be resuscitated according to Newborn Life Support Guidelines.

These infants should be stabilised prior to transfer to the Neonatal Unit, which should always be undertaken using a transport incubator. The duty middle grade neonatal doctor/ANNP or Consultant should be informed and accompany any baby transferred as an emergency to the Neonatal Unit.

13.5.2. Abnormal Respiratory Signs

Infants with abnormal respiratory signs (with the exception of isolated grunting) should be given free-flow oxygen and be referred immediately to the duty neonatal team. They will undertake an assessment of the baby and admit the infant to the Neonatal Unit for further observation and assessment. This assessment may include monitoring of heart rate, oxygen saturations and a capillary blood gas. Such infants may require immediate resuscitation and stabilisation prior to transfer. Transfer to NICU should always be undertaken using a transport incubator.

13.5.3. Grunting from birth or isolated grunting

Infants with grunting as the only feature may in some circumstances be observed and managed on the postnatal ward. All babies who are grunting at any stage should be reviewed immediately by the neonatal ST Trainee/ANNP who will undertake a capillary blood gas and measure the oxygen saturations. The attending midwife should measure the axillary temperature and blood glucose and should take remedial action if these are abnormal. If these assessments are satisfactory the infant may continue to be observed on the postnatal ward for the time being. However babies who develop other signs of respiratory distress, **or** who show other non-specific features such as lethargy, poor feeding or poor perfusion **or** who have one of the risk factors above (see page 10) will need admission to NICU.

If the baby continues to grunt persistently then the middle grade ST trainee/ANNP should be asked to review at 2 hours of age, to repeat the investigations and consider admission. Any infant in whom the grunting has not settled by 4 hours postnatal age should automatically be admitted to NICU.

13.5.4. Late-onset Grunting

Infants with late onset grunting (i.e. not present in the first hour) should be considered as having sepsis until proven otherwise. Such infants warrant immediate review and admission to NICU.

14. Examination of the CVS

Despite advance in antenatal scanning, most congenital heart disease (CHD) is still undiagnosed at birth and babies continue to present with cyanosis or a heart murmur.

Even in the experienced hand, the neonatal check fails to detect many babies who are later found to have significant heart disease. Although it will never be possible to

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detect all lesions it is to be hoped that careful examination should diagnose the majority.

All babies born in hospital or admitted in postnatal ward after birth outside hospital (this could be for maternal or neonatal reasons) should have their oxygen saturations checked postnatally 4-8 hours after birth. This will be performed by midwives/midwifery care assistant (MCA).

Practitioners undertaking the routine neonatal examination should ensure that oxygen saturations have been recorded in the baby notes. If oxygen saturations have not been performed, the midwife looking after the baby should be requested to do this. If the baby is more than 8 hours old then the test should still be undertaken as it still has value in screening for congenital heart disease. [Refer to Trust Guideline on Routine Oxygen Saturation Measurement of the Newborn \(Trustdocs ID: 10566\)](#)

14.1. History

- Family history of congenital heart disease (first degree relative).
- Fetal trisomy 21 or other trisomy diagnosed (these babies have high risk of cardiac defects and require continued surveillance).
- Cardiac abnormality suspected from the antenatal scan.
- Maternal medical history e.g. drug-related teratogens during pregnancy, for example, antiepileptic and psychotropic, alcohol intake, maternal exposure to viruses, congenital infections, maternal diabetes (type1), systemic lupus erythematosus (SLE), CHD.

Parents should be asked if:

- The baby ever gets breathless or changes colour at rest or with feeding.
- The baby's feeding behaviours and energy levels are normal.
- The baby is ever too tired to feed, quiet, lethargic, or has poor muscle tone

14.2. Examination

14.2.1. Observation

- Any dysmorphic features e.g. features of Down's syndrome (40-50% have heart defects).
- Observe for signs and symptoms of respiratory distress, such as tachypnoea, retractions and grunting.
- General appearance, colour and peripheral perfusion.

14.2.2. Palpation

Palpation covers:

- Femoral and brachial pulses for strength rhythm and volume.
- Assessment of perfusion through capillary fill time.
- Position of cardiac apex (to exclude dextrocardia).

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- Palpation of liver to exclude hepatomegaly – may be present in congestive heart failure.
- +/- thrill.
- No babies should be discharged from the hospital until the femoral pulses have been documented to be palpable.

14.2.3. Auscultation

Auscultation covers:

- Presence of a murmur – systolic / diastolic – loudness.
- Quality of heart sounds at the following 5 sites:
- Second intercostal spaces adjacent to the sternum: left (pulmonary area).
- Second intercostal spaces adjacent to the sternum: right (aortic area).
- Lower left sternal border in the 4th intercostal space (tricuspid area).
- Apex (mitral area).
- Mid scapulae (coarctation area).

14.2.4. Cyanosis

Implies that the baby has a dusky blue hue. A degree of peripheral cyanosis is not uncommon, and if cyanosis is suspected it is important that central cyanosis is confirmed.

- Infants are not uncommonly blue around the mouth, and if this observed you should check whether the tongue or lips has a similar colour.
- If the infant is genuinely centrally cyanosed then the baby should be admitted to the neonatal unit.
- If there is a continuing clinical doubt, check the baby's post ductal oxygen saturations, applying pulse oximeter probe to either foot for half an hour. Ensure a good pulsatile trace.
- If post ductal SaO₂ is below 95%, the infant must be admitted to the neonatal unit for investigation and monitoring.

14.3. Heart Murmurs

Heart murmurs may be either innocent or pathological.

- Refer to the Trust guideline for the management of '[Heart Murmurs in Newborn Babies \(Trustdocs ID: 1223\)](#)'.

15. Examination of the Abdomen and Genitalia

15.1. History Look for the following:

- Review antenatal scans and ask the parents if any abnormality was detected antenatally e.g. abdominal mass, cyst or renal abnormality.

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- Check if there is a “Neonatal Alert” sticker on the notes or in the antenatal scans report and if any, refer to the “Neonatal Alert Folder” located on NICU reception.
- Follow the plan in the “Neonatal Alert”.
- Discuss with the consultant covering postnatal ward if needed.

15.2. Examination should include the following:

1. A check of whether the baby has passed meconium and urine (enquiring about urine stream in a boy).
2. Inspection for abdominal distension, umbilical hernia, and the cord stump.
3. Palpation for any masses or organomegaly.
 - a. Be gentle especially after feeds.
 - b. Liver edge can be normally felt up to 2 cm below the right costal margin.
 - c. Tip of the spleen can be felt up to 1 cm and is normal.
 - d. Kidneys can be felt; note any abnormally large renal masses.
4. Auscultation need not form part of the routine abdominal examination.
5. Genitalia: check if male or female and if in doubt ask for senior review.

15.3. Male Genitalia

Associated risk factors include:

- A first degree family history of cryptorchidism (baby’s father or sibling).
- Low birth weight.
- Small for gestational age or preterm birth.
 - Inspect the penile length (normally about 3 cm), occasionally can be buried in suprapubic fat.
 - Check the position of the urethral meatus; checking for hypospadias.
 - Inspect the shaft of the penis for curvature i.e. chordee.
 - Examine the scrotum for shape, colour and rugosity and feel for the testes; if one or both testes are undescended further assessment needs to be made (see below).
 - Inspect the groin for hernia: if present needs further review (see below).

15.4. Female Genitalia

1. Inspect the vulva: in full term babies the labia majora should cover the labia minora, note the size of the clitoris.
2. White mucoid vaginal discharge (occasionally blood stained) is normal.
3. Other normal findings: hymenal skin tags, mucoid cysts resolve spontaneously.

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4. Inguinal hernias are rare and their presence should raise the possibility of other abnormalities in the genital tract.

15.5. Anus check position, patency and tone.

Problems and actions to be taken:

- Abdominal masses should receive senior review.
- Bile-stained vomiting/abdominal distension/failure to pass meconium within 48 hours of birth needs emergency review by neonatal and surgical teams.
- For antenatally detected abnormalities (e.g. renal tract abnormalities) and where "Paed Alert" exists follow the plan and if in doubt discuss with senior neonatal colleague.
- Discuss with the parents any abnormal finding and the plan for investigations and follow up if indicated.
- Record findings, discussions with parents and plan in the relevant notes.

15.6. Inguinal Hernia

Refer to the surgical team before discharge. There is a high risk of incarceration at this age.

15.7. Hydrocele

This is likely to resolve when the persistent processus vaginalis (PPV) spontaneously closes before the age of two years. Reassure the parents and ask them to go to the GP if the swelling is still present after one year of age. Ensure there is no hernia (i.e. you can get above the swelling) and if in doubt refer to surgeons.

15.8. Umbilical Hernia

Reassure the parents that this is likely to decrease in size, no treatment is indicated. Pain or incarceration is uncommon and the need for later surgery very unlikely.

15.9. Testicular Torsion

Discoloration of scrotum, bruising, firmness, pain on handling with or without swelling could be a sign of testicular torsion. This is a surgical emergency and requires immediate referral to the paediatric surgical team.

15.10. Unilateral undescended testes

Most will descend spontaneously by three months of age. If not descended by 6 months GP should be asked to refer to the surgical team. An automated letter will print out from NIPE SMART with this information for the GP and parents. If there is any associated abnormality refer to the surgical team before discharge.

Unilateral undescended testis should be reviewed at 6-to-8-week NIPE examination (GP)

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15.11. Bilateral undescended testes

Cryptorchidism affects approximately 2 to 6% of male babies born at term. It is associated with:

- A significant increase in the risk of testicular cancer (primarily seminoma)
- Reduced fertility when compared with normally descended testes
- Other urogenital problems such as hypospadias and testicular torsion
- Bilateral undescended testes in the newborn may be associated with ambiguous genitalia or an underlying endocrine disorder such as congenital adrenal hyperplasia.

Early diagnosis and intervention improves fertility, reduces the risk of torsion and may aid earlier identification of testicular cancer. For any baby requiring review for bi-lateral undescended testes, follow the NIPE Bilateral Undescended Testicle Pathway (Appendix 6).

15.11.1. Screen positive following newborn examination

Bilateral undescended testes should be seen for assessment by a senior paediatrician within 24 hours of the examination to rule out metabolic and intersex conditions. NIPE Bilateral Undescended Testicle Pathway to be followed (see Appendix 3).

May require a karyotype and further investigation. Discuss with middle grade/consultant immediately. Inform the surgical team before discharge.

15.12. Hypospadias

Refer to the surgical team as an outpatient. There is usually no need for an urgent inpatient referral unless there are bilateral undescended testes or other pointers of ambiguous genitalia. Inform the parents about the plan. Circumcision for any reason is contra-indicated when hypospadias is present. The prepuce may be required for the repair.

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15.13. Ambiguous genitalia

If in doubt about the baby's sex, refer to middle grade/consultant immediately. Inform the parents that at present it is not possible to tell the sex of their baby. If it is the case, reassure them that the baby is otherwise healthy. Inform them that the baby will be reviewed by a senior member of the team and a number of investigations will be required to determine the baby's sex.

16. Examination of the Musculoskeletal system

16.1. History

Look for the following:

- Review antenatal scans and ask the parents if any abnormality was detected antenatally e.g. talipes.
- First degree family history of developmental dysplasia of the hips (DDH).
- Breech presentation at delivery.

16.2. Examination

It includes examination of the spine, extremities, and joints in particular the hip joint. A lot can be gained from observing the baby's posture and movements before starting the formal examination.

There is also overlap between different systems examined, for example asymmetric Moro reflex could signify neurological abnormality e.g. Erb's palsy, but could be secondary to fractured clavicle, or contracture.

16.3. Examination of the spine

1. Inspect the back for any obvious curvature, or midline abnormalities over the spine e.g. swelling, dimple, hairy patch or birth mark; any may indicate an underlying vertebral or spinal abnormality.
2. Any midline lesion other than simple dimple in or just above the natal cleft should be investigated, discuss with middle grade/consultant.
3. Note movements of the lower limbs, assess tone.

16.4. Examination of the upper limbs

1. Inspect the arms for shape, posture, symmetry and size.
2. Note any deformities.
3. Inspect the palm for number of fingers, and arrangement of creases.
4. Observe spontaneous movements of the shoulder, elbow and wrist joints: asymmetric movement might suggest fracture or Erb's palsy.
5. Test passive movements for muscle tone and range of motion.
6. Palpate both clavicles for swelling, tenderness or crepitus if suspecting a fracture.

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16.5. Examination of the lower limbs

1. Inspect the legs and feet for shape, posture, symmetry and size.
2. Note any deformities.
3. Observe spontaneous movements.
4. Test passive movements for muscle tone and range of motion.
5. Note the position of the feet and ankles.

16.6. Examination of the hip joints, National hip risk factors

The NHS NIPE programme national hip risk factors are:

- First degree family history of hip problems in early life. This includes baby's parents or siblings who have had a hip problem that started as a baby or young child that needed treatment with a splint, harness or operation.
- Breech presentation at or after 36 completed weeks of pregnancy (as confirmed by ultrasound scan), irrespective of presentation at birth or mode of delivery. This includes breech babies who have had a successful external cephalic version (ECV).
- Breech presentation at delivery if this is earlier than 36 weeks gestation.
- For babies with any of the above risk factors, hip ultrasound examination should be arranged and in the case of multiple births with these risk factors, all babies in the pregnancy should have a hip ultrasound examination.

The rationale for this advice is that if one of the babies meets the criteria of breech presentation, as described above, it may be difficult to accurately identify which baby was affected.

See Appendix 7 for pathway for any babies who require USS for identified risk factors or abnormal finding on examination.

16.7. Undertaking the examination

Before the examination practitioners should establish:

- Mother's recent obstetric history.
- Baby's family history.
- National hip risk factors.
- The examination should take place in a warm environment and on a firm flat surface with the baby undressed and settled.

16.8. Observation

Observation covers:

- Symmetry of leg length.
- Level of knees when hips and knees are both flexed.
- Symmetry of skin folds in the groin when baby is in ventral suspension.

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- If legs can be fully abducted.
- Manipulation.
- Undertake both the Ortolani and Barlow manoeuvres on each hip separately to assess hip stability.

Ortolani manoeuvre is used to screen for a dislocated hip.

Barlow manoeuvre is used to screen for dislocatable hip.

Refer to the "[Trust Guideline for the management of Developmental Dysplasia of the Hip Trustdocs ID: 1189](#)) for examination algorithm, risk factors and indications for ultrasound examination.

16.9. Problems and actions to be taken:

Simple sacrococcygeal pits/dimples

- If you can see the base and no other midline abnormality; no action indicated.
- If the base is not visible, and there is an additional cutaneous marker or other abnormalities, discuss with senior colleague regarding further investigations.

16.10. Polydactyly (hands and feet)

- Look specifically for any dysmorphic features.
- Middle grade review and inpatient referral to Mr Jonothan Clibbon, Consultant Plastic Surgeon on extension 4492.

16.11. Duplicated, missing or hypoplastic thumbs

- Absent and hypoplastic thumbs are more common than duplicated thumbs in Fanconi's anaemia (FA)
- Needs genetic referral to Dr Sarju Mehta, Department of Clinical Genetics, Box 134, Addenbrooke's Hospital, Hills Road, Cambridge, CB2 2QQ. Phone: 01223 217027, Fax: 01223 217054.

16.12. Erb's Palsy

- Middle grade review.
- Discuss investigations (chest x-ray) and on-going management with the attending consultant.
- All babies with evidence of persisting brachial plexus injury at the time of neonatal examination/NIPE should be referred routinely for physiotherapist review prior to discharge home.
- A follow up appointment should be made for outpatient clinic review with either Consultant Neonatologist or Consultant Paediatric Orthopaedic Surgeon.

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16.13. Fractured clavicle

- The most common birth trauma.
- X-ray confirms clinical suspicion.
- Explain to the parents the clinical and x-ray findings.
- Reassure the parents, heal spontaneously no action needed

16.14. Talipes

- *Postural* is fully correctable to neutral position by gentle passive movement.
- Reassure the parents that it is benign and self-limiting.
- *Structural* need physiotherapy referral before discharge. [See Trust Guideline for the Initial Management of Congenital Talipes \(Trustdocs ID: 1296\)](#).
- For all cases of structural talipes arrange routine ultrasound of the hip joints.

16.15. Hip joints

Ultrasound scans should be booked on all babies with clinically suspected instability of the hips as well as all babies with risk factors (breech presentation, family history of DDH or talipes). NIPE Hip Risk Factors/Abnormal Hip Findings Pathway to be followed (Appendix 7) and refer to [Refer to Trust Guideline for the Management of Developmental Dysplasia of the Hip \(Trustdocs ID: 1189\)](#)

17. Neurological examination

17.1. General points

Much useful information regarding the neurological status of the newborn infant comes from general inspection and from observations during the other parts of the assessment.

Important information that relates to neurological assessment that can be gained from other parts of the newborn examination include:

- History: As with other systems, the family, maternal, pregnancy and birth history should be reviewed.
- Presence of dysmorphic features.
- Evidence of birth trauma, such as cephalhaematoma, bruising, lacerations, swelling.
- Skin lesions, including café au lait spots (neurofibromatosis), haemangiomas (port wine facial haemangioma in Sturge-Weber), depigmented areas (tuberous sclerosis).
- Abnormalities overlying the spine: the presence of hairy patches, dermal pits and vascular malformations over the spine and their role as occult markers of underlying spinal dysraphism are discussed elsewhere.
- The head circumference measurement taken at birth: if you have any concerns, measure the head circumference again.

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The neurological assessment looks at movement and posture, tone, primitive reflexes, the quality of the cry and the overall behavioural status of the baby

17.2. Suggested scheme for examination:

- Observe the infant lying supine, observe spontaneous movements.
- Passive movements of limbs, tendon reflexes, ankle clonus.
- Pull to sit.
- Upright suspension.
- Ventral suspension.
- Primitive reflexes – Moro and palmar.

Observe the infant lying supine

Attention to the overall *behavioural state* of the infant is a very sensitive indicator of the integrity of the nervous system.

An irritable infant will cry with minimal stimulation and is difficult to soothe

A lethargic infant is difficult to rouse.

Look at the posture and movements of the baby and if possible, the quality of their cry.

17.3. Crying

- A loud, energetic cry is normal in the term baby.
- A weak or feeble cry can indicate the baby is generally unwell or that there is an abnormality of the nervous system such as weakness or reduced tone.
- A high-pitched cry may be present in infants with neurological disturbance, metabolic problems or drug withdrawal.

17.4. Posture

- **Normal**

It is normal to assume a flexed posture, with intermittent extension.

The resting posture for the hands is one of loose fisting. Arms and legs are mostly adducted, held towards the body.

- **Abnormal**

Hypotonic: A baby with low tone will adopt a frog posture, in which all 4 limbs lie flat against the surface, with little resistance to gravity and reduced spontaneous movement. [See Trust Guideline for the Assessment of a Floppy Baby \(Trustdocs ID: 1203\)](#).

Hypertonic: A baby with high tone will be in a predominant state of flexion or extension. For example, with cerebral irritation, they often adopt extensor posturing, with arching of the back, scissoring of the legs and adduction of the thumbs across the palms.

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17.5. Spontaneous Movement

Observe the pattern and quality of movements of the head, limbs and body.

- **Normal**
There should be symmetry of movement. The normal baby will flex and extend their fingers and toes in a series of symmetrical movements. There should be some antigravity movement in all 4 limbs.
- **Abnormal**
Lack of movement may indicate nerve trauma or damage. Brachial plexus injury can lead to lack of movement of one arm. Brain injury can lead to various patterns of limb weakness and paucity of movement.
- **Jitteriness**
Jitteriness is common. It is characterised by rapid alternating movements of equal amplitude in both directions. Jittery movements can be elicited by environmental stimuli (noise or touch) and can be stopped by flexing and holding the affected limb. Jitteriness is sometimes elicited by crying.

Excessive jitteriness can occur with drug withdrawal, hypoglycaemia and hypocalcaemia.

Jitteriness is distinct from the abnormal movements associated with seizures

- Jitteriness is stimulus sensitive; seizures are not.
- Jittering has symmetrical tremors, whereas seizure may be focal.
- Seizure movements often have fast and slow components.
- An infant with jitteriness never has accompanying autonomic physiological changes such as apnoea, tachycardia, hypertension.

17.6. Passive movement of the limbs

Tone

Observation of posture, as above, gives a good overall assessment of the tone. An assessment of the resistance to passive movement of the limbs gives an indication of tone in the limbs.

Both sides of the body and the upper and lower limbs should be compared. During passive flexion and extension of the arms and legs, the head must be in a midline position. Tone should be described as increased, decreased or normal.

- **Normal**
There should be symmetrical resistance when comparing each side of the body and also when comparing arms and legs.
- **Abnormal**
Hypotonic: focal brain injury can result in various patterns of hypotonia and weakness (e.g., hemiparesis). Cervical spinal cord injury can lead to flaccid weakness in the limbs. Generalised hypotonia may indicate lower motor neurone disease such as spinal muscular atrophy.

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Hypertonic: can be seen meningitis or, as a later development in hypoxic injury of the brain. Sometimes seen in conjunction with raised intracranial pressure and haemorrhage.

17.7. Tendon Reflexes

The patellar reflex is the easiest to elicit and the most reliable in the newborn. It is tested by tapping the patellar tendon just below the kneecap, while the examiner's hand supports the baby's knee in a flexed position.

- **Normal**
Extension of the knee and visible contraction of the quadriceps muscle.
- **Abnormal**
Usually, these will be absent or reduced (commonly in those conditions associated with hypotonia as outlined above). It is unusual to elicit exaggerated reflexes, but they are sometimes seen in, for example, infants with neonatal abstinence syndrome or cerebral irritability.

17.8. Ankle Clonus

Clonus is rapid movement across a joint following sudden stretching of a tendon. In the newborn examination, clonus is most easily elicited at the ankle.

- **Normal**
Up to 10 beats of clonus
- **Abnormal**
Sustained clonus may occur in, for example, cerebral irritation.

17.9. Pull To Sit

From the supine position, grasp the baby's shoulders or hands and pull slowly from a supine to sitting position.

- **Normal**
The head leaves the bed almost immediately, lagging only minimally behind, when they have reached the sitting position, the head remains erect momentarily and then falls forward. Mild head lag is normal in the first weeks of life.
- **Abnormal**
Excessive head lag indicates hypotonia. Do not place excessive stress on the baby's neck during this procedure.

17.10. Upright suspension

From the sitting position, lift the infant, supported under the axillae and around the chest. Be careful not to allow the baby to slip from your grip.

- **Normal**
The infant will hold the posture for a short while and then slip through your hands.

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- **Abnormal**

The hypotonic infant will not be able to hold themselves up for any period of time and would begin to slip through your grip from the outset.

17.11. Ventral suspension

From the upright position, turn the baby onto the palm of your hand and hold in ventral suspension, facing downwards.

- **Normal**

The baby will intermittently hold the head in line with the body and straighten his/her back. The limbs will hang down, but with some tone.

- **Abnormal**

A hypotonic infant will droop around the examiner's hand. If hypertonic, they will hold the head and legs in line with the back for extended periods and feel stiff.

17.12. Primitive Reflexes

Moro

Hold the neonate in a supine position, with the head a few centimetres off the bed. Withdraw the hand supporting the head, allowing it to fall back into your hand.

- **Normal**

The Moro response to this stimulus consists of abduction and extension of both arms, followed by opening of the palms. The arms are then brought in and flexed slightly, with closure of the fists.

- **Abnormal**

Asymmetry of movements may indicate, e.g., brachial plexus injury. Complete absence suggests neurological depression.

Palmar grasp

Stimulating the palmar surface of the hand with a finger should cause the baby to grasp the finger. Attempts to withdraw lead to tightening of the grasp.

18. Training & Competencies

Neonatal nurses, Midwives and ANNPs must have successfully completed the Newborn and Infant Physical Examination Course or hold an equivalent qualification and will maintain a portfolio to provide evidence of ongoing continuing professional development. Junior paediatric medical staff must have successfully completed a competency assessment in examination of the newborn. (See Appendix 1)

NIPE Annual Learning Framework to be undertaken by all NIPE examiners annually, via <https://www.e-lfh.org.uk/programmes/nhs-screening-programmes/>

Midwives are expected to complete the competency assessment. (See appendix 2)

In addition, midwives and ANNP's will be required to complete the following online learning package on ESR <http://intranet/ESR/>

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ESR 234 Radiation Protection and IR(ME)R Training for Non-Medical Referrers (45 mins)

Midwives must complete online learning annually via <https://www.e-lfh.org.uk/programmes/nhs-screening-programmes/> as part of their Learning beyond Registration (LBR)

A Record should be kept of all junior doctors who attended the induction session on newborn examination, to ensure all attend.

A Competency assessment in “newborn examination” log kept in an electronic form and in a signed paper form with requirement of all doctors being assessed as soon as possible after the induction week.

For critical incident reporting refer to the [Trust Policy for the Reporting, Management and Investigation of Incidents, Near Misses and Serious Incidents.](#)

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<https://www.gov.uk/government/publications/newborn-and-infant-physical-examination-programme-handbook/newborn-and-infant-physical-examination-screening-programme-handbook>

Wren C, Richmond S, Donaldson L (1999) Presentation of congenital heart disease in infancy: implications for routine examination. **Archives of Disease in Childhood. Fetal and Neonatal Edition**; 80: F49-53

20. Monitoring Compliance

Compliance with the process will be monitored through the following:

Key elements	Process for Monitoring	By Whom (Individual / group /committee)	Responsible Governance Committee /dept	Frequency of monitoring
KPI NP1/ ANNB NIPE SO1 NIPE coverage - screening completed within 72 hours	Quarterly review and submission to NHSE	ANNBS Team/ NICU Lead for NIPE	Antenatal and Newborn Steering Group Meeting	Quarterly
Standard 2/ANNB NIPE SO2 Timely intervention: eye abnormality seen within 2 weeks	Quarterly review and submission to NHSE	ANNBS Team/ NICU Lead for NIPE	Antenatal and Newborn Steering Group Meeting	Quarterly
KPI NP3/ ANNB NIPE SO3 hip ultrasound for babies with abnormal findings/risk factors within 4-6 weeks of age (corrected age if born <34 weeks gestational age)	Quarterly review and submission to NHSE	ANNBS Team/ NICU Lead for NIPE	Antenatal and Newborn Steering Group Meeting	Quarterly
ANNB NIPE SO4 Timeliness of clinical assessment or discharge. Specialist orthopaedic apt by 6 weeks of birth or 40 weeks corrected age if born < 34 weeks gestation age	Quarterly review and submission to NHSE	ANNBS Team/ NICU Lead for NIPE	Antenatal and Newborn Steering Group Meeting	Quarterly

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<p>ANNB NIPE SO4 Timeliness of clinical assessment or discharge. Specialist orthopaedic apt by 6 weeks of birth or 40 weeks corrected age if born < 34 weeks gestation age</p>	<p>Quarterly review and submission to NHSE</p>	<p>ANNBS Team/ NICU Lead for NIPE</p>	<p>Antenatal and Newborn Steering Group Meeting</p>	<p>Quarterly</p>
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Clinical audit standards derived from guideline_

The Paediatric and Maternity Services are committed to the philosophy of clinical audit, as part of its Clinical Governance programme. The standards contained in this clinical guideline will be subject to continuous audit, with multidisciplinary review of the audit results at one of the monthly departmental clinical governance meetings. The results will also be summarised, and a list of recommendations formed into an action plan, with a commitment to re-audit within three years, resources permitting.

The audit results are to be discussed at relevant governance meetings and Antenatal and Newborn Screening Steering Group Meetings to review the results and recommendations for further action. Then sent to the relevant Sub-Board who will ensure that the actions and recommendations are suitable and sufficient.

Trust Guideline for the Newborn and Infant Physical Examination (NIPE)

21. Appendices

21.1. Appendix 1- Newborn and Infant Physical Examination (NIPE) Competency Assessment

All members of staff expected to carry out NIPE will be observed and assessed to be competent in performing the examination as regards to the standards set out below.

Standards for the Examination

Preparing for the Examination

- Purpose and procedure of examination explained to the parents and verbal consent taken.
- Family, maternal and perinatal histories are reviewed and documented.
- The condition of the baby since birth has been considered and discussed with the parents and is documented.
- Note the baby's weight and head circumference and decide if appropriate for gestational age.

Observation

- The routine examination of the newborn begins with the overall observation of the baby.

Performing the examination

Top to Toe assessment

- The examiner complies with hand hygiene and infection control standards.
- Exposed parts of the baby are examined first.
- Colour of the baby assessed.
- Respiratory effort is assessed.
- A cardio-vascular assessment is undertaken, including femoral pulsation.
- Aspects of the baby cry noted.
- Posture, tone and movements assessed.
- Facial features noted e.g. eyes, ears, nose.
- Red reflex checked both eyes.
- Mouth examined - palate checked.
- Neck checked to identify contractures, swelling or fistula. Clavicle palpated.
- Abdominal examination performed; bimanual palpation to detect any renal masses.
- Gender and appearance of genitalia is assessed and patency and position of anus examined.
- Palpation for testes.

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- Umbilical cord inspected.
- Following gentle abduction, the hips are tested using both the Barlow and Ortolani's tests.
- Back and spine examination takes place.
- Hands and palms examined. Feet are observed and examined to identify postural abnormalities.
- Head examined for size (OFC), fontanelles and sutures.
- Reflexes: Moro, grasp, rooting, sucking.
- Any skin lesions are identified.

Communication and Documentation

- The findings of the examination are discussed with the parents and any questions/queries answered.
- The findings of the examination are appropriately and accurately recorded in the Kardex and Child Health Record (red book).

Referral

- Respond to any abnormal finding appropriately as per unit guidelines e.g., Heart murmur, breech.
- The parents are given a full explanation of the reason and time scale of the referral.

Adapted from Best Practice Statement (May 2008): Routine examination of the newborn, NHS Quality Improvement Scotland

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21.2. Appendix 2 - Competencies in Assessment of the Newborn (NIPE)

Trust Guideline for the Newborn and Infant Physical Examination (NIPE)

Competencies in Assessment of the Newborn (NIPE)

Performance criteria	The midwife will demonstrate:	1	2	3	4	5	6	7	8	9	10
1	Review the baby's notes before the assessment is conducted										
1.1	Review the mother's obstetric history, noting the outcome and dates of previous pregnancies										
1.2	Identify the mother's last menstrual period and relate to the reputed gestational age of the baby and Ultrasound reports										
1.3	Note the mother's age and social background										
1.4	Examine the maternal family history, highlighting any relevant conditions, which may impact on the health of the newborn										
2	Review the antenatal period and identify the nature and extent of any complications										
2.1	Consider any relevant investigations or diagnostic procedures										
2.2	Evaluate any prescribed treatments										
3	Identify the onset of labour and the time when the membranes were ruptured										
3.1	Appraise the length of the first and second stage of labour										
3.2	Examine the occurrence of any fetal heart rate variations and annotate fully										
3.3	Consider the mode of delivery and its possible impact on the newborn										
4	Appraise the Apgar scores at 1 and 5 minutes										
4.1	Evaluate any resuscitation procedures, particularly noting the extent and length										
4.2	Appraise the type and dosage of any drugs administered since birth										
4.3	Refer to any investigations carried out on the baby										
4.4	Judge the physical characteristics of birth weight, head circumference in accordance with the reputed gestational age and align with current growth charts. (WHO 2012).										
5	Ensures the baby's physical status is commensurate with an effective examination										
5.1	Enables effective communication of a sensitive and confidential nature between parent and examiner										
5.2	Ensures the baby's safety and comfort before and during and completion of the assessment.										
6	Explains reasons for undertaking the examination and provides an overview of the examination process.										
6.1	Determines the parent's understanding of the nature of the examination										
6.2	Elicits parent's views of health/wellness status and identifies any anxieties.										
6.3	Ensures the parent is aware of the benefits and limitations										

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21.4	Any obstacles which may make communication difficult are minimised																			
21.5	Effective communication is encouraged by appropriate facial expression, body language, sensory contact, position and environment																			
21.6	Where the initial form of communication is not effective, different approaches are used or sought																			
21.7	Information given by parents are checked with her/him for accuracy																			
22	Accurate information should be directed to the appropriate agency																			
22.1	Referral to information is given in a manner, level and pace consistent with the role of the midwife																			
22.2	Referral policy is adhered to																			
22.3	Record findings on NIPE Smart System																			

	Signature of assessor	Date <i>(dd/mm/yyyy)</i>
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10		
.		

NIPE Failsafe Daily Checks

Trust Guideline for the Newborn and Infant Physical Examination (NIPE)

Date:

Name of Practitioner in NIPE clinic:

Please sign to say you have CHECKED and COMPLETED the following:

All **well** babies with incomplete NIPE have been identified and their check performed (please cross reference handwritten list with electronic list on NIPE Smart)

Please Sign:

Any **well** babies that cannot be located within the hospital (e.g. homebirths) have been escalated to the midwife in charge and a note added to the system

Please Sign:

All **NICU** babies with incomplete NIPE have been identified and highlighted to the appropriate team (i.e. TC babies to TC team, Room 3 to Room 3 team etc) and the job book updated accordingly

Please Sign:

All **NICU** babies that cannot be located within the hospital are escalated to Dr Bhoomaiah, Consultant on-call, Sarah Cole, Lynn Jones and Alison Evans

Please Sign:

NB. To add a note to the system: select the baby and on the demographics page there is a section titled case notes. In the top right corner of this box there is a +, select this and you can add a note. Please file the note as a screening note and select the priority as important.

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Newborn & Infant Physical Examination (NIPE)						
Gestational age:			Full explanation & information sheet given: <input type="checkbox"/>			
Full history taken: <input type="checkbox"/>			Significant family history of DDH: No <input type="checkbox"/> Yes <input type="checkbox"/>			
Mothers consent obtained: <input type="checkbox"/>						
Examination:	✓ if NAD	✓	Comments	✓ if NAD	✓	Comments
Skin				Abdominal palpation		
Activity/head control/tone				Cord		
Cry				Genitalia: Female <input type="checkbox"/> Male <input type="checkbox"/>		Testes R <input type="checkbox"/> L <input type="checkbox"/>
Head/hair				Hands		
Face				Feet		
Eyes: red reflex present			Left <input type="checkbox"/> Right <input type="checkbox"/>	Femoral Pulses		Left: <input type="checkbox"/> Right: <input type="checkbox"/>
Ears				Urine passed		
Nose				Anus		
Mouth				Meconium passed		
Palate visualised			Soft <input type="checkbox"/> Hard <input type="checkbox"/>	Hips		Barlows: Ortolani:
Neck				Back/Spine		
Clavicles				Reflexes		Suck/Swallow/ Gag/Moro/Step Grasp/Babinski
Chest				Routine O2 sats		
Heart			Apex beat: Heart Sounds:	Feeding Breast/formula/mixed		
Lungs						
Referrals/recommendations						
Hearing screening performed: No <input type="checkbox"/> Yes <input type="checkbox"/>			Passed: No <input type="checkbox"/> Yes <input type="checkbox"/>			
Significant findings/ reason for referral /Comments						
Follow up appointment /outpatients appointment requested:					No <input type="checkbox"/> Yes <input type="checkbox"/>	
Name of department referred to:						
Referral letter complete:					No <input type="checkbox"/> Yes <input type="checkbox"/>	
Baby case notes requested:					No <input type="checkbox"/> Yes <input type="checkbox"/> N/A <input type="checkbox"/>	
Date:		Time:		Infants Age:		hours
*Signature of examiner: Print name:				Designation:		

21.3. Appendix 3- NIPE Completion within 72 hours failsafe Pathway

21.4. Appendix 4- NIPE Daily Failsafe Responsibility by Practitioner Pathway

In addition

21.5. Appendix 5- NIPE Neonatal Eye Referral Pathway

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21.6. Appendix 6- NIPE Bilateral Undescended Testicle Pathway

NIPE Abnormal Hip Findings Pathway

21.7. Appendix 7- NIPE Hip Risk Factors/Abnormal Hip Findings Pathway

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22. Equality Impact Assessment (EIA)

Type of function or policy	Existing
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Division	Neonatal and Obstetrics	Department	Neonatal
Name of person completing form	Charlotte Aldous	Date	28/04/2023

Equality Area	Potential Negative Impact	Impact Positive Impact	Which groups are affected	Full Impact Assessment Required YES/NO
Race	None	None	N/A	No
Pregnancy & Maternity	None	None	N/A	No
Disability	None	None	N/A	No
Religion and beliefs	None	None	N/A	No
Sex	None	None	N/A	No
Gender reassignment	None	None	N/A	No
Sexual Orientation	None	None	N/A	No
Age	None	None	N/A	No
Marriage & Civil Partnership	None	None	N/A	No
EDS2 – How does this change impact the Equality and Diversity Strategic plan (contact HR or see EDS2 plan)?	N/A			

- **A full assessment will only be required if: The impact is potentially discriminatory under the general equality duty**
- **Any groups of patients/staff/visitors or communities could be potentially disadvantaged by the policy or function/service**
- **The policy or function/service is assessed to be of high significance**

IF IN DOUBT A FULL IMPACT ASSESSMENT FORM IS REQUIRED

The review of the existing policy re-affirms the rights of all groups and clarifies the individual, managerial and organisational responsibilities in line with statutory and best

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practice guidance.