East Midlands
Neonatal Operational Delivery Network

NETWORK GUIDELINE

Guideline:	**Referral for Surgical Assessment and Management Pre-Transfer in the East Midlands**
Version:	**01**
Date:	**February 2024**
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Approval:	**EMNODN Clinical Governance Group**
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Consultation:	**EMNODN Clinical Governance Group**
Distribution:	**Neonatal Units within EMNODN**
Risk Managed:	**Access for babies and their families requiring surgical assessment (excluding cardiac)**

This document is a guideline. Its interpretation and application remains the responsibility of the individual clinician, particularly in view of its applicability across the different Trusts in the East Midlands Neonatal Operational Delivery Network. Please also consult any local policy/guideline document where appropriate and if in doubt contact a senior colleague.

Caution is advised when using guidelines after a review date.

REVIEW AND AMENDMENT LOG

Version	Type of Change	Date	Description of Change
1	-	October 2023	New guideline

Contents

1.0 Introduction

This guideline is to enable appropriate and prompt access for babies and their families requiring surgical assessment (excluding cardiac). It covers the usual referral pathways for both antenatal and postnatal transfers. It is beyond the scope of the guideline to cover all the many individual conditions and their management but does outline some general principles and cross references to other guidelines where possible.

Links to the CenTre clinical stabilisation guidelines for common surgical conditions and contents of the surgical box are included in sections 4.1 and 7.

2.0 Antenatal Referrals

2.1 Referral for Conditions requiring Early Surgical Intervention

- When antenatal scans indicate a diagnosis where early surgical intervention is anticipated to be needed and delivery in the tertiary centre is desirable e.g. diaphragmatic hernia, abdominal wall defects.
  Early discussions with the surgical and/or neonatal team help with consistency of information and the consent process.
- Where there is no local fetal medicine service - referral to one of the fetal medicine units in Nottingham or Leicester will assist with confirmation of diagnosis (Appendix 2 and 3).
  In some cases discussion may be appropriate with John Radcliffe Oxford and Birmingham Women's Hospital;
  A referral should be made to the relevant surgical team. (Appendix 1).
- Referrals can be made:
  - Obstetrician to Obstetrician within the fetal medicine service
  - If possible, ensure the relevant surgical consultant (appendix 1) is copied into the referral.
  - Involvement of a named paediatrician locally can be helpful. Referral information should also clearly state which local paediatric staff are already involved with a family and what information has already been given.
- The East Midlands Fetal Medicine Group (a subgroup of the East Midlands Clinical Maternity Network) has detailed guidance around referral pathways for fetal medicine in the East Midlands available via their website. If the link below does not open – copy and paste into a browser.

https://www.england.nhs.uk/midlands/clinical-networks/east-midlands-clinical-network/our-networks/maternity/maternity-resources/

The following table gives some indication of conditions where surgical referral is appropriate

Refer antenatally and deliver in tertiary unit	**Deliver in DGH (discuss post-natally with surgeons)**
CDH (Congenital Diaphragmatic Hernia	CCAM/CPAM (without hydrops / mediastinal shift)
OA (Oesophageal Atresia) / TOF (definite) (Tracheo –Oesophageal Fistula)	Neural Tube Defects*
Gastroschisis	Other renal problems (without oligohydraminos)
Exomphalos	Small to medium sized uncomplicated intra-abdominal cysts
Sacrococcygeal teratoma	
Small bowel atresia	
Significant airway problems e.g. large cystic hygromas, other neck masses	
Vein of Galen malformations	
Complex cases with surgical issues	
Major nephrological/urological anomalies (in conjunction with nephrology where appropriate)	

*Neural Tube defects

- The neurosurgical unit for the East Midlands neonatal ODN is Queen's medical centre.
- Refer antenatally to Paediatric Neurosurgery QMC (Appendix 1) - usually arranged through the Feto-maternal Clinic (FMC).
- Delivery in the local unit is usually possible with closed defects with transfer rarely being urgent. Early or immediate postnatal transfer may be needed for open defects and therefore it is preferable for mum and baby not to be separated and for delivery to occur in the neurosurgical centre. The timing of the transfer should be discussed with the tertiary unit and the paediatric neurosurgical team.

For complex cases with multiple problems that include surgical issues, these can be discussed with a consultant paediatric surgeon from the appropriate surgical team.

The antenatal referral pathway is outlined in the flow chart in appendix 2.

3.0 Management plans

3.1 Antenatal Management Plans

- The management of ongoing antenatal care and planning of delivery will be made by the relevant obstetric teams and depends on services available locally.
- The local paediatric team should be kept involved (a named paediatrician is helpful) as they often have long-term involvement with the family.
- Referral information should clearly state which paediatric staff are already involved with a family and what information has already been given
- Where major nephrological/urological anomalies are detected, the usual referral pathway is via the Fetal Medicine team in conjunction with the Paediatric Nephrology team in the same centre.

- All management plans should be communicated by letter to local teams with a copy placed in the maternal handheld notes, should a delivery happen away from the intended centre

3.2 Capacity Planning

Many babies require delivery in the surgical centre but this can present challenges when a unit is at or near capacity because of staffing or cots. Individual neonatal units will have locally agreed plans for how deliveries are managed when ODN pathways cannot be followed for capacity reasons.

A wider network team approach may at times be needed to create capacity within the surgical centre where possible. These plans may include handover and delivery in another of the surgical centres; in utero transfers of less complex cases out of the surgical centre; or capacity transfers to non-surgical centres for stable babies who can be cared for in a local neonatal unit or special care unit. The aim of this is to ensure safe delivery especially when a multidisciplinary approach is needed after the birth of the baby whilst maintaining a high level of care for babies ready for step down care. The aim is not to prioritise one baby's care over another. Consideration of the impact of capacity planning on the families involved is important in order to fully assess need.

Flexibility at local level is necessary but there is an overarching plan for managing capacity within the Midlands Region aims to provide a consistent approach to the escalation of operational pressures.[7]

3.3. Postnatal management plans

- Scans may indicate a diagnosis where the postnatal course and need for surgery is less predictable and where delivery can take place in the booking hospital e.g. dilated bowel loops,
- Early discussions with the surgical team and a single visit to the surgical centre can be helpful.

4.0 Postnatal Referrals and Transfers

Postnatal transfers for surgical assessment may be acute e.g. diaphragmatic hernia, gastrointestinal perforation, malrotation, volvulus or non-acute conditions e.g. ano-rectal malformation.

It is important to differentiate the stable infant requiring elective surgery and the unstable baby where input from a tertiary clinician with advice around medical management and stabilisation may be required. Referral for unstable babies should be made via the CenTre team[7] https://www.centreneonataltransport.nhs.uk/healthcare-professionals/refer-to-centre/acute-referral/

The postnatal pathway is outlined in the flowchart in appendix 4

4.1 Acute Transfers

The local team are responsible for resuscitation and stabilisation while awaiting the transport team. If the parents have been seen at a local tertiary care antenatally by neontatal team/ relevant specialists, they may have written birth plan with them. Close liaison between the tertiary care, transport team and local team is required to optimise pre surgery condition and will need to be individualised for each baby. The principles in preparing for transfer are detailed in the separate EMNODN Transport Stabilisation Guideline[1]. For the specific conditions given below some principles, taken from the transport guideline, are outlined but these must be considered in the context of the general care given in the Transport Stabilisation Guideline.

Contents of CenTre Surgical Box[6]

- Replogle Tube Size 8 F and 10 F
- Size 8 F nasogastric tube
- Free drainage pot / small bile bag / mucous extractor pot (Whichever is locally stocked)
- V-drape isolation bag
- Cling Film
- CenTre surgical information booklet and reference cards

4.2 Guidance for Specific conditions[2,3,4,5]

4.2.1 Gastroschisis

Most babies with this condition don't need intubating electively. This should only be done if evidence of respiratory compromise.

Problems:

- Hypovolaemia due to fluid loss from the exposed bowel
    - Reduce losses – place baby in a Bowel bag (Vi-Drape bag) up to their armpits (NB – in antenatally diagnosed cases the parents should have a bag given to them). No nappy needed. If no bag – use clingfilm.
    - Give fluid. Up to 60ml/kg may be needed in the first six hours. Assess volume status frequently by measuring losses in plastic bag (difficult), blood pressure, toe/core temperature gap trend and by estimating capillary refill time. Replace volume with 0.9% sodium chloride in 10ml/kg aliquots. This should be instituted prior to arrival of the transport team, who will continue this regimen.
    - Early NG losses may represent amniotic fluid especially if clear but once initial gastric drainage has been done, losses should be closely monitored and replaced.

- Hypothermia
    - Reduce heat loss – place in bag as above
    - Overhead warmer
    - Measure temperature regularly throughout stabilisation

- Bowel ischaemia (black/purple, poorly perfused bowel),
    - Positioning is the key. Place the baby on their side with the intestines in front of them. Do not let the intestines drag or be pulled away from the baby.
        i. If side positioning, place a folded towel underneath the bowel (outside of bag) to support the bowel at the same level of the midline, this will reduce the risk of compression at the abdominal wall defect.
        ii. If required, the baby can be positioned on their back with the bowel on their abdomen and towel supports either side of their body (outside of bag) to

reduce risk of bowel falling to the side and becoming compressed at the abdominal wall defect.
    - Twisting – check the bowel is not twisted (difficult)
    - Discuss with surgical team if concerned

- Infection – intravenous antibiotics should be considered as the bowel has been exposed

4.2.2 Congenital diaphragmatic hernia

- Always ventilate and muscle-relax infants with CDH.
- Position with hernia side down.
- Place a large-bore (Min. 10 FG) naso-gastric tube on free drainage with regular aspiration to decompress the gut.
- Think permissive hypercapnia and avoid using higher pressures to ventilate where possible - discuss detailed pre-transfer management with the transport team and/or receiving centre.

4.2.3 Oesophageal atresia/tracheo-oesophageal fistula.

- Place a replogle tube in blind end of oesophagus.
- Nurse infant with head up and ensure secretions are not allowed to build-up in the proximal oesophageal pouch by application of either continuous low-pressure suction (5-10cm/H_2O) or by intermittent aspiration (minimum of every 15 minutes).
- A small amount (0.2 – 0.5ml) of 0.9% Saline may be instilled into the smaller replogle lumen, in order to loosen secretions every 15 minutes.

- Try to avoid ventilating babies who have both oesophageal atresia and a tracheo-oesophageal fistula, as a connection between the airways and the distal gut is a feature of the condition and ventilation may lead to massive irreducible gut distension.
- **Discuss with surgical centre if this is necessary – it is an indication for urgent transfer and probable surgery on arrival.**

4.2.4 Gastro-intestinal obstruction (including NEC/perforation/ileus, etc)

- Obtain abdominal X-Ray
- Place a wide bore naso-gastric tube on free drainage with regular (minimum 2hrly) aspiration.
- Replace NG losses if over 10ml/kg/day. Meticulous fluid balance should be kept.
- If perforation is causing gross abdominal distension sufficient to cause significant respiratory compromise, **discuss with surgical team** and consider needle decompression.
    - Clean skin with aqueous chlorhexidine.
    - Insert a 21G cannula at right angles to the skin in the right lower quadrant just sufficient to enter the peritoneal cavity (usually <1cm). Take care to ensure that the liver is not enlarged or displaced into this area.
    - Allow gas to escape then remove cannula and seal exit point.

4.3 Preparation for the Acute Transfer

- Resuscitation and stabilisation can often be challenging and close liaison between centres is required to address the immediate problems.
- Documentation and communication are essential (see 1 for details). Getting to surgery as soon as possible may be life-saving so minimising avoidable delays is crucial. Make sure documentation (including all x-rays), any required samples (especially maternal blood clearly and completely labelled), infusions and fluids are ready and prepared in a way to reduce transfer time.
- Radiology can be sent electronically via the PACS link.

4.4 Non-acute transfers

- When a non-acute transfer is required e.g. a well baby with ano-rectal malformation, the referral and transfer can usually be done during the working day. The referral pathway detailed in the postnatal referral flow chart in appendix 4.

- Those with intestinal obstruction, e.g. duodenal atresia and anorectal malformations will need a nasogastric tube on free drainage, intravenous fluids and be kept nil by mouth until transferred & assessed.

4.5 Family Care

Transfer between units is a source of stress and anxiety for families. To minimise this ensure parents are informed as early as possible that transfer is needed or being considered. Where an infant is transferred for specialist care the probability of return transfer to the local unit should be raised. Prepare parents for the change of unit base by reassuring them that high standards of neonatal care are in place at all network units. Give the parents an information pack regarding the receiving unit if available.

5.0 Consent

Valid consent can only be obtained by a surgeon who is capable of performing the procedure. Consent may usually only be given by:

- Either parent, if they were married at the time of the baby's birth, OR
- The baby's mother, if the parents are not married.
- Unmarried father's only if they are named on the birth certificate (thus, only possible after the mother has registered the birth).
- If a person appropriate to give consent will be at the surgical centre before surgery is required, then inform this person that it is essential that they keep this arrangement, so that consent may be obtained by a surgeon. Also obtain details of phone numbers where the appropriate person(s) may be contacted by the surgical team if surgery is needed before they come to Nottingham.

Document this clearly in the notes.

If surgery may be required following transfer, but before a valid consent-giver will be present in the receiving centre (nor contactable by telephone) then it will be necessary for the referring and receiving centre consultants, including the surgical consultant, to discuss the possible options.

6.0 Failure to stabilise

If the baby remains very unwell and unstable following a period of stabilisation by referring and/or transport teams, consideration should be given as to the best course of action. There are no clear rules for this situation. Factors which may need to be considered are:

Is the baby dying?

- There should be a discussion between the Consultants in the referring and receiving centres, transport team and local nursing staff.
- If this is the case then it is most appropriate for the baby to die in the referring centre with the parents present.
- It may be necessary for the team to prolong their stay to help with the withdrawal process in order to support the referring centre. After discussion between the local unit and regional transport team it may be appropriate for the team to stay and support the withdrawal of life sustaining treatment.

Might surgery at the end of transfer retrieve the baby in extreme circumstances?

Transfer may be undertaken if:

- the transport team feels the baby has a chance of surviving the journey,
- the baby is an appropriate candidate,
- the parents are aware of the risks of transfer.

7.0 References

1. EMNODN Transport Stabilisation Guideline https://www.emnodn.nhs.uk/_files/ugd/143840_04609fb8b0c04721976111046 43f8100.pdf
2. The following guidelines are accessible from a login to the staff portal but pdf copies can be requested directly from the NUH surgical team
    a. NUH Clinical guideline for abdominal wall defects
    b. NUH Clinical guideline for congenital diaphragmatic hernia
    c. NUH Clinical guideline for Necrotising Enterocolitis
3. UHL Handbook for Neonatal Surgery
4. CenTre Surgical Box
5. Neonatal ODN Escalation of Operational Pressures & Surge Plan https://www.emnodn.nhs.uk/_files/ugd/6ba139_0592b3845aa7469ca165b33fa0267e7c.pdf
6. CenTre acute referral policy https://www.centreneonataltransport.nhs.uk/healthcare-professionals/refer-to-centre/acute-referral/

Appendix 1

Contacts for referrals

1. Transport
    a. CenTre transport team Tel 0300 3000038

2. North Hub
    a. Antenatal cases - Nottingham fetal medicine team - Feto-maternal Clinical (FMC) at Queen's Medical Centre 0115 924 9924 ext 81924 and the email is - nuhnt.fetalmedicineservices@nhs.net

    b. Post natal cases – contact - Nottingham surgical team via on-call paediatric surgery consultant (Via switchboard) & on-call registrar 07812268916

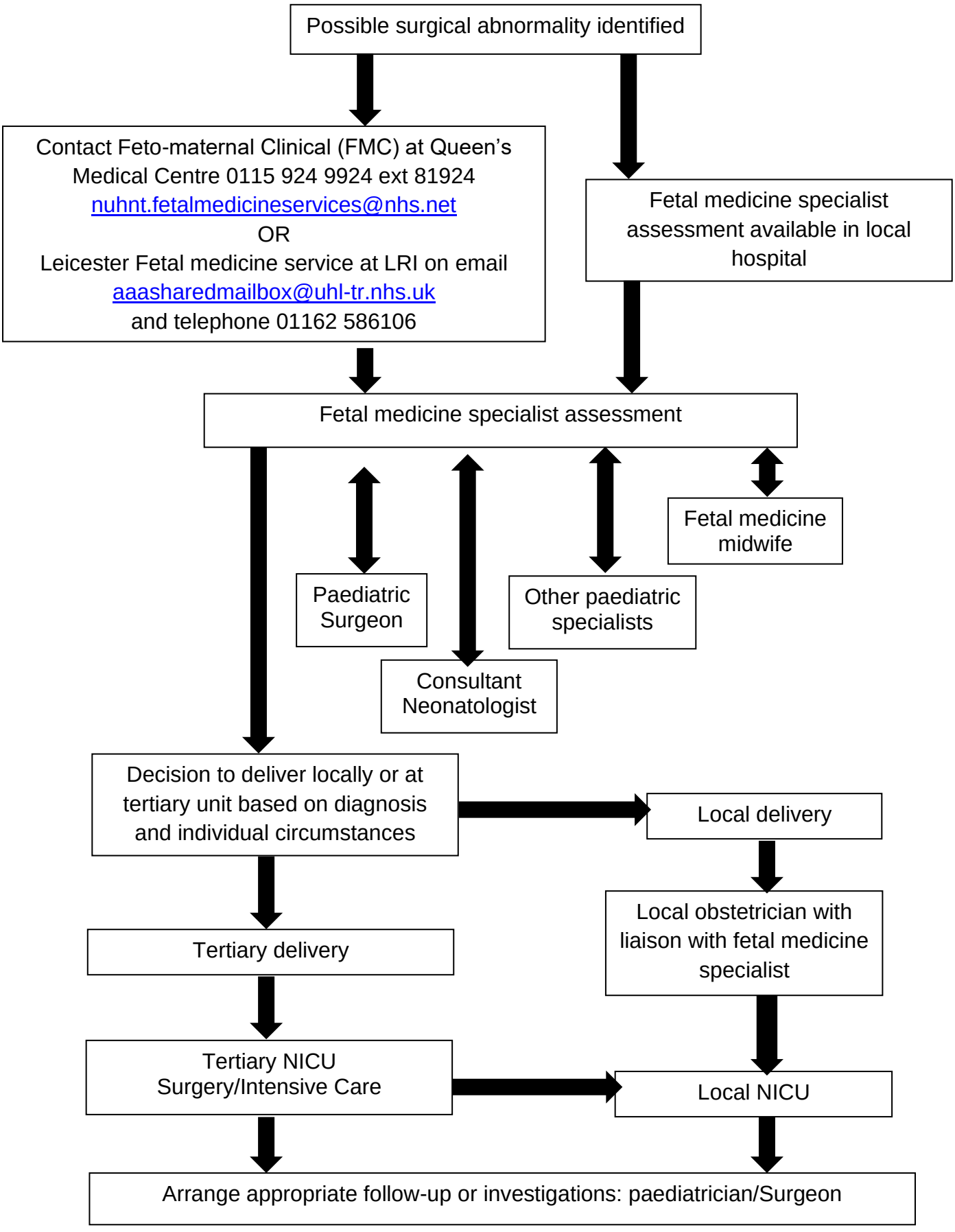
    c. Neurosurgical referrals
        i. in hours or antenatal cases - contact the Feto-maternal Clinic (FMC). at Queen's Medical Centre 0115 924 9924 ext 61924 who will liaise with Paediatric Neurosurgical team
        ii. Out of hours – if urgent advice is needed for a post natal referral, contact the on call neurosurgical team via switchboard

3. South Hub
    a. Antenatal cases - contact Leicester fetal medicine specialist midwives on 01162 586106 and email a referral to aaasharedmailbox@uhl-tr.nhs.uk . Do not just send the referral by email as when there is pressure on appointment slots, the fetal medicine midwifery team will be able to triage and coordinate to ensure parents are seen in an appropriate clinic.

    b. Post natal cases – contact - Leicester surgical team – On Call Paediatric Surgeon/Registrar available via switchboard.

    c. Neurosurgical referrals
        i. In hours or antenatal cases - contact the Feto-maternal Clinic (FMC). at Queen's Medical Centre 0115 924 9924 ext 81924 and/or email nuhnt.fetalmedicineservices@nhs.net. They will liaise with Paediatric Neurosurgical team
        ii. Out of hours – if urgent advice is needed for a post-natal referral, contact the on call neurosurgical team via switchboard

Appendix 2
Antenatal referral to QMC or UHL (depending on usual referral pathways)

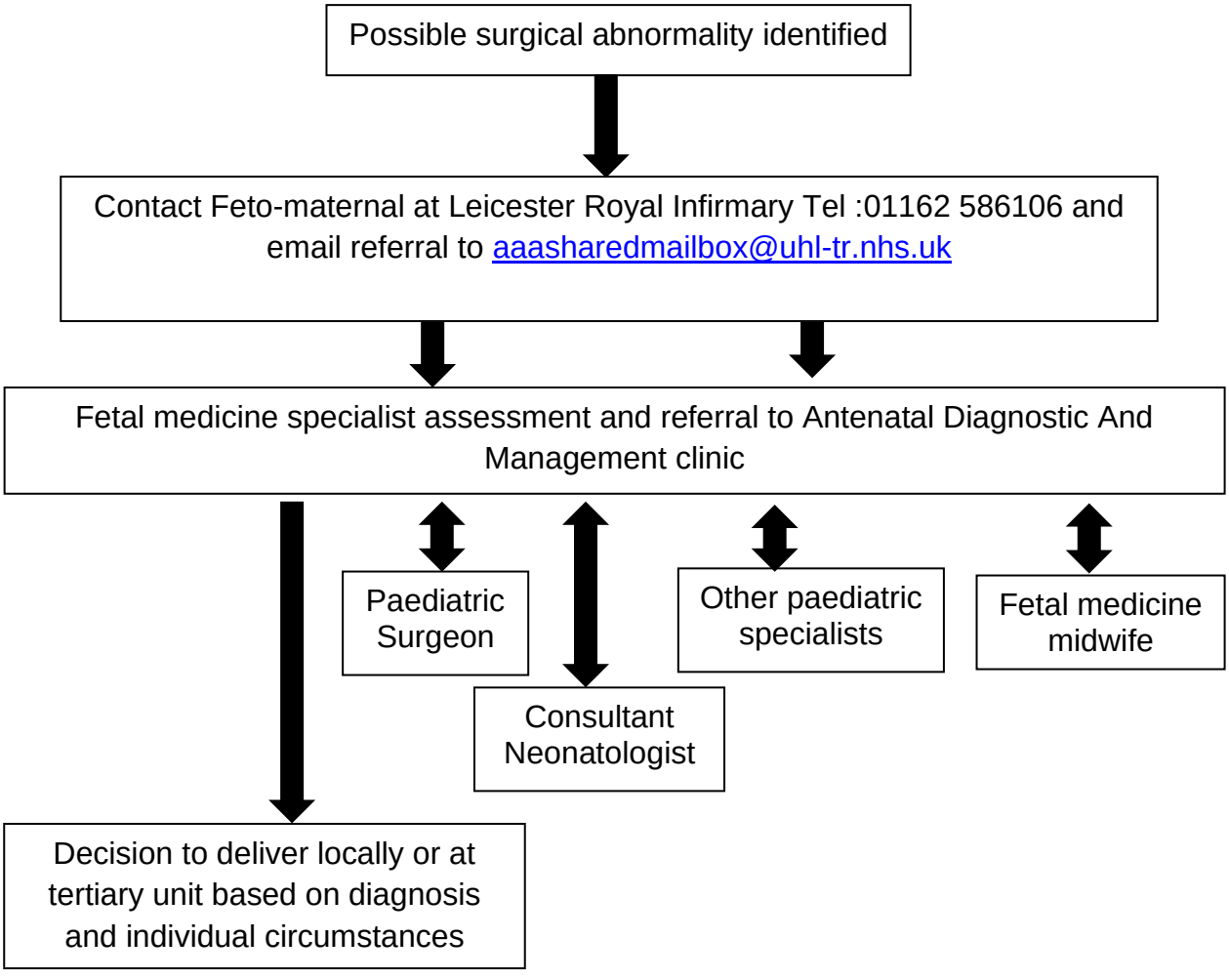


Appendix 3
Antenatal referral within the South Hub to linked surgical centres

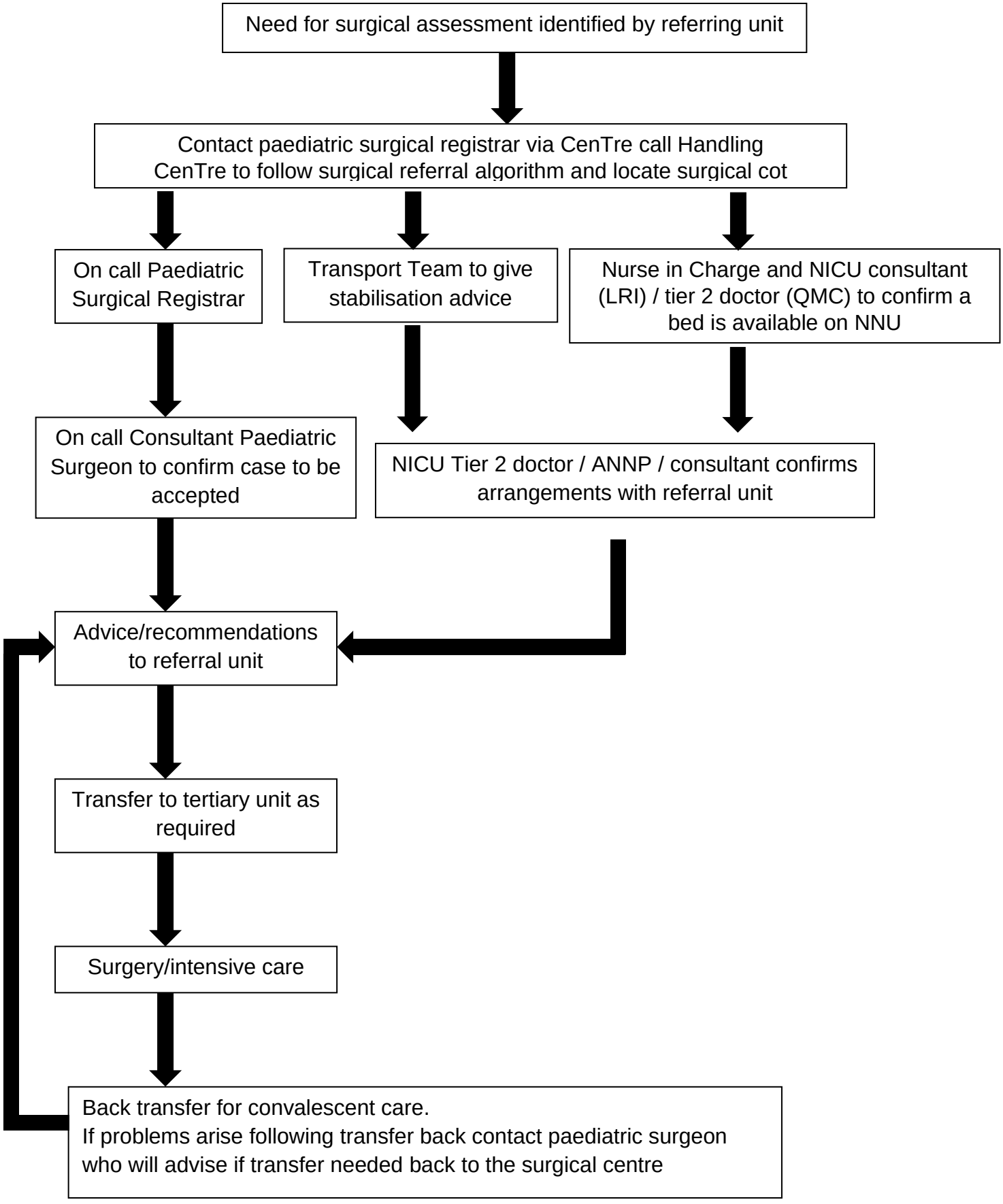
Summary of Antenatal Pathways for Units in EMNODN (south)

Unit	Antenatal	Postnatal
General Surgery		
Kettering	Leicester Neonatal Service	Leicester Neonatal Service
Northampton	John Radcliffe Oxford / Leicester Neonatal Service	Leicester Neonatal Service
Queen's Hospital Burton	Queen's Medical Centre via Derby Fetal Medicine	Leicester Neonatal Service
Leicester Neonatal Service	Leicester Neonatal Service	Leicester Neonatal Service
Neurosurgery		
Kettering	Queen's Medical Centre	Queen's Medical Centre
Northampton	John Radcliffe Oxford	John Radcliffe Oxford
Queen's Hospital Burton	Queen's Medical Centre via Derby Fetal Medicine	Queen's Medical Centre
Leicester Neonatal Service	Queen's Medical Centre	Queen's Medical Centre
Urology		
Kettering	Leicester Neonatal Service	Leicester Neonatal Service
Northampton	JR Oxford	Leicester Neonatal Service or JR Oxford if antenatal involvement
Queen's Hospital Burton	Queen's Medical Centre via Derby Fetal Medicine	Leicester Neonatal Service or B'ham if antenatal involvement
Leicester Neonatal Service	Leicester Neonatal Service	Leicester Neonatal Service

Referral should be made to the relevant fetal medicine service – For referrals into Leicester – the flow chart below outlines the process.

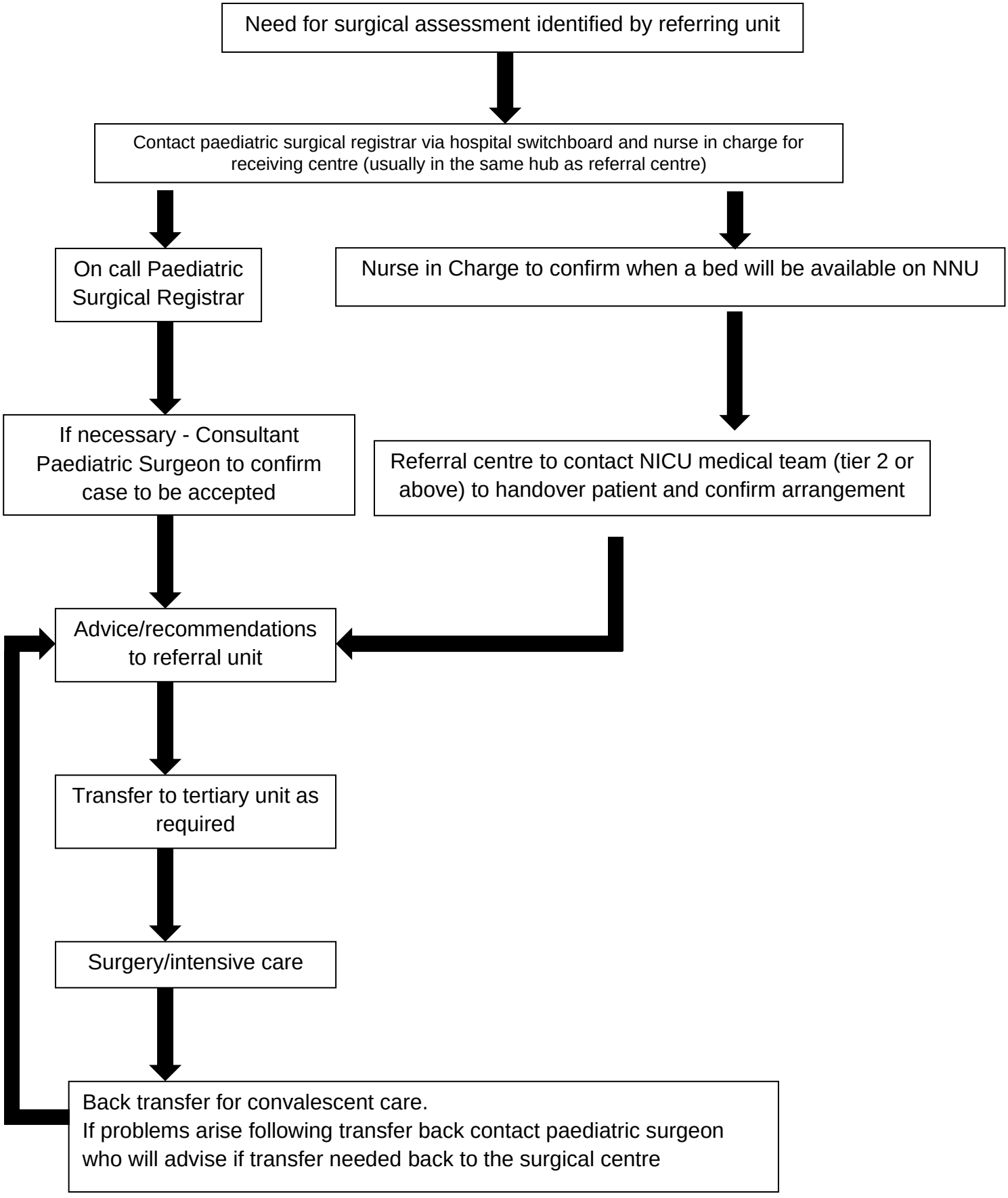


Appendix 4
Postnatal Referral for unstable babies or acute problems – QMC and UHL



If unable to transfer to named receiving hospital due to lack of neonatal cots, CenTre call handling to connect to transport team for referral and bed-finding

Appendix 5
Referral of a stable baby for an elective procedure or non urgent assessment



If unable to transfer to named receiving hospital due to lack of neonatal cots, CenTre call handling to connect to transport team for referral and bed-finding

Appendix 6
NUH Neonatal Inguinal Hernia Referral Form

Please affix patient label
Patient Name:
Date of birth:
NHS / K Number:

East Midlands Neonatal Operational Delivery Network

NUH NEONATAL INGUINAL HERNIA

*Date of referral			
Diagnosis:			
*Made by		Date	
***Reviewed and confirmed by surgeons** **Yes/No** If yes, name and designation:			
Details of any previous surgeries/Anaesthesia:			
Birth weight	kg	Current weight	kg
Gestation at birth	weeks	Current corrected gestation	weeks
Current problems:		Resolved problems:	
Oxygen requirement	Yes/No	Details	
*Anticipated date of discharge			

	✓ when complete
Surgical team contacted Name and designation of surgeon(s):	☐
Planned date for surgery?	
Are the parents aware?	☐
QMC information booklet given (available on Network website)	☐
Has QMC consultant and Nurse in charge been contacted: Name and designation of person(s):	☐
Is the cot space available?	Yes / No
Has transport team been contacted and transport arranged?	☐
Preoperative blood investigations and results available	Yes / No
Please email this form to QMC NICU on service consultant and speak to the team on 0115 875 4529 to ensure it has been received and file it in the notes. Update on cot availability at QMC + plans are usually discussed during Friday surgical meeting.	