NHS
East Midlands
Neonatal Operational Delivery Network

NETWORK GUIDELINE

Guideline:	**Transport Stabilisation**
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Approval:	**EMNODN Clinical Governance Group**
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Consultation:	**EMNODN Clinical Governance Group**
Distribution:	**Neonatal Units supported by CenTre Neonatal Transport Service**
Risk Managed:	**Effective stabilisation to ensure safe, effective and timely transportation between neonatal units**

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 documents 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	-	-	-
2	-	-	-
3	-	-	-
3	No change	Sept 2018	Joint CNN & TPN Guideline transferred to EMNODN Guideline format
4	No change to content.	Sept 2019	6 month review date added to coincide with Transport trolley replacements and new ventilators
5	Updates to document which take into account new equipment and changes in practice within CenTre	April 2022	Full review of document and updated to take account of the introduction of new transport trolleys, ventilators as well as practice changes

1. Introduction

This guideline aims to standardise procedures in preparing babies for transfer between neonatal units. It details the responsibilities of neonatal units and transport teams at the time of transfer, with the aim of promoting seamless transfer of care between units. The tasks that need attending-to in preparing a baby for transport are detailed. Some tasks are the responsibility of the referring team, others the responsibility of the transport team, and these are highlighted as such. Other tasks may need to be done, but may be performed by either the referring or transport team.

CenTre Neonatal Transport are the commissioned transport service for the 11 neonatal units in the EMNODN and 3 neonatal units in the West Midlands Neonatal ODN, namely; Coventry, Nuneaton and Warwick.

Paediatric intensive care and ECMO transfers are undertaken by the relevant specialist teams.

Terms
In this guideline the “referring unit” is the unit where the baby is before transfer and the “receiving unit” is the unit to which the baby is to be transferred.

2. Patient Group/Indications

This guideline applies to all infants undergoing transfer into or out of a network neonatal unit, including both planned and unplanned transfers.

In-utero transfer is believed to be the safest transport option, and should be arranged when there is a predictable need for specialist care of the baby from birth and where the risks of maternal transfer have been taken into account.

3. Personnel and Responsibilities

The referring team is responsible for the care of the infant while in their unit. After the transport team has arrived there is shared responsibility, and the Transport Consultant will offer clinical support and guidance regarding stabilising for transport and the decisions that may need to be made. The receiving unit Consultant and other specialists may be involved at every stage, but the patient is the responsibility of the referring unit/transport service while in the referring unit, and the transport service alone whilst in transit.

Preparation and stabilisation for transport is primarily the responsibility of the medical and nursing team at the referring unit.

4. Stabilisation

General Principles:

- Stabilise infants thoroughly for transport. It is not usually necessary to transfer even very unwell infants before vital signs are optimised
- Effective transfer involves clear communication and sharing information the receiving unit will need to continue the baby’s care

- There should be a family centred approach to care, and the needs of the family must be considered routinely
- For PIC and ECMO transfers the transporting team can advise about any specific requirements.

Airway
The goal of airway stabilisation is to minimise the potential for airway emergencies in transit. The airway should be assessed and stabilised by the referring unit, according to the guidance below and in consultation with the transporting team.

For infants who are not intubated and where there is doubt about the need for intubation for transfer there should be discussion between referring and Transport Consultant.

Diagnosis
Some diagnoses require special consideration:

- **Congenital diaphragmatic hernia.** All infants with this diagnosis are best intubated, ventilated and sedated (including muscle-relaxation) for transport
- **Oesphageal atresia (OA)/ tracheo-oesophageal fistula (TOF).** Infants with OA, and where TOF is suspected, often present with mild respiratory distress. Avoid ventilation/CPAP in this group if possible, as it may cause critical abdominal distension if there is a fistula to the distal gut. If there are concerns it is advised to discuss the need for ventilation with the transport and/or receiving Consultant
- **Infants** who are stable on CPAP or Heated Humidified high flow nasal cannulae (HHHFNC, often referred to as HiFlow) should not routinely be intubated for transfer. If there is uncertainty, the need for intubation should be discussed with the transport team/consultant.

Endotracheal Tubes
Ensure ETT's are correctly positioned and secured, to avoid accidental extubation or other technical problems in transit. The transport team is responsible for assessing all ETTs are suitable for transfer. The criteria are:

- Position- If the tube is too long or too short on CXR the position must be corrected or the tube changed
- Fixation- If the tube is not sufficiently secured to guarantee the airway for the transfer it must be re-secured or replaced
- Patency- If the tube is blocking it should be replaced

It is not necessary to change ETTs that are not the same brand or type as those used by the transport team, or if the baby is nasally intubated.

A chest X-Ray is needed to check ETT position before transfer if a new ET tube has been placed or the position had to be readjusted.

NB: Distance is a factor when considering need for intubation for transport.

Breathing
Respiratory support available in transit

The following ventilation modes are available:

- For ETT ventilation (CMV, SIMV, , HFOV)
- Inhaled nitric oxide
- CPAP
- Nasal cannula oxygen
- HHHFNC

Acute Illness
The goal of stabilising the respiratory system for transport is to establish stable, acceptable blood gas and respiratory monitoring parameters on a respiratory support mode that may be continued in transit. This should be achieved by the referring unit in conjunction with the transport team. In order to do this:

- Administer **surfactant** if indicated. Give second dose if indicated and if the due time will fall during the transfer. Ideally babies given surfactant should not be transferred for at least 30 minutes after the dose, and then only following reassessment of the respiratory system and the support being given
- Monitor for both over and under-ventilation, particularly after any significant interventions. Ensure that any trend to low or rising pCO_2 is identified and acted on before transfer
- Establishing **arterial access** can be very helpful if the infant requires frequent blood gases or close cardiovascular monitoring but this should not unduly delay transport.
- **Ventilation mode.** Aim to keep the infant on the current mode of ventilation for transfer, unless clinical indicators/blood gases suggest an alternative mode may be more beneficial. If ventilation mode needs to be changed allow time to monitor effect and stabilize before moving if possible. Ideally any changes to ventilation modes are best done prior to arrival of transport team to allow time to monitor the impact.
- **Sedation** May be given to babies who will be ventilated in transit if it is felt they are not stable enough to tolerate the transfer without this. Muscle relaxation is not routinely indicated for transfer
- Most **pneumothoraces** will require a chest drain before transfer, particularly if the infant requires respiratory support. Be satisfied that air leaks have stabilised before transfer
- **Chest X-Ray** will be needed to assess pathology and response to interventions. Where possible, share X-Rays between the clinical teams involved
- Where persistent pulmonary hypertension is the presenting or complicating feature the transport team can give a trial of nitric oxide or HFOV

Circulation
The goal for transport is to establish an adequate cardiac output to enable the timely move of a baby to another unit. This is measured using heart rate, pulses and blood pressure. A 'safe', acceptable blood pressure and other cardiovascular parameters is the aim rather than 'normalisation'. Assessment and stabilization of the circulation should be initiated by the referring unit, according to the guidance below and in consultation with the transport service. In order to do this:

- A recent full blood count for all acute transfers is helpful, particularly if packed red cell transfusion is being considered for volume
- Arterial access, if not already established, should be considered in infants who require repeated blood gas analysis and / or accurate blood pressure measurement. Umbilical lines must be well-secured and an X-Ray taken/reviewed to confirm appropriate line placement and catheter tip position. If the lines are replaced/re-positioned the X-Ray must be repeated to verify position before transport
- Blood pressure support may be needed if mean BP is consistently low in an unwell infant, and that support should be started before transfer. Where the BP is borderline it is appropriate to prepare and connect inotrope infusions prior to transfer, so they may simply be turned on if needed in transit
- Anaemic infants may need transfusion prior to (or during) transfer
- Obtain maternal blood samples (clotted and EDTA) prior to all acute transfers, and ensure these are fully labelled with maternal details. Both the label on the bottle and form must be handwritten (i.e. no printed labels)
- If coagulopathy is suspected this should usually be checked and, if appropriate, treatment initiated before transfer

Feeds/Fluids
The goal of 'stabilising' the GI system is to ensure the baby receives adequate calorific and fluid intake via a safe route during transfer. In general, tubes and lines necessary for this should be placed by the referring unit prior to arrival of the transport team and checked for position and patency.

a. Babies Receiving Enteral Feeds
Discussion between referring and transport teams will be needed to agree a safe plan.

Consider the following when making the decision about enteral feeds vs IVI (intravenous fluid infusion) and NBM (nil by mouth) for transport:

- Well babies on planned transfers may be fed before the journey; and also during a planned stop while in-transit if it is a longer journey
- The length of the journey i.e. time without nutrition/glucose, as well as acuity of the infant should be considered.
- Feed frequency. A baby on hourly feeds going on a 2 hour transfer probably needs an IVI. A baby on 4 hourly feeds going on a 2 hour transfer probably does not. The transport team will advise
- Feeds and/or fluids would also depend on the size and corrected gestation of the baby on the day of transfer

- The referring unit should have the most recent blood sugar result available at the time of referral

b. Babies Requiring IV Maintenance Fluids

Fluids should be drawn from the infusion bag into a 50 ml syringe, checked and have a correctly completed and signed additive (if indicated) label attached to the syringe. If a baby has drug infusions already in progress, these may be used for transfer providing they are in a 50 ml syringe.

Infusions of drugs prepared by non-transport staff may be used during the transfer, providing that:

- Transport staff check that the relevant prescription(s) are correct and signed-for.
- The infusion has not expired, or will not expire during the time of the transfer.
- The prescription chart, or a copy of it, should accompany the baby.
- The remaining volume is sufficient for the anticipated journey – safe practice is to estimate the time anticipated for the journey and double that to allow for delays.

It is essential that all fluid and drug infusion prescriptions are properly checked by two members of staff. This can be transport staff, unit staff or a combination of both.

These two members of staff should preferably not include the prescriber, though this may be unavoidable in some transport situations.

c. Babies Receiving PN

Fluids for transfer are given using 50ml syringes, so it is not possible to continue a PN bag in transit. In most instances it will be best to replace the PN with an appropriate IV Glucose infusion. If referring and receiving unit agree, it may be possible to leave the PN connected but turned-off so that it may be continued after the transfer.

Preparation of the Baby

Check blood glucose prior to departure on acute transfers and attend to any abnormality.

Ensure that cannulae are secure, patent and insertion sites are visible. Loss of IV cannulae is a complication of transfer and all IVs must be well secured.

Most infants being transferred acutely require an NGT, and this should be on free drainage if gut pathology is present or suspected.

The transport team will assess all vascular access devices before departing with the baby. Their criteria are:

- Position, especially umbilical lines and long lines. These should be X-Rayed to assess position if not already done so. UVCs should be documented as having freely aspirated blood in the present position by either referring or transport team
- Security – Lines are secured appropriately to avoid dislodgement during transfer
- Patency – Ensure fluids and medications are infusing as prescribed

Temperature
Assess temperature and consider the support required for transfer. The goal of the stabilisation period is a temperature that is normal (36.5 – 37.5), or is trending toward normal. This should be attended-to by the referring team. The transport team should not usually depart on a transfer with a baby whose temperature is either not normal or trending toward normal (therapeutic hypothermia being the exception).

Humidity should be used routinely for infants <30 weeks and / or 1000g in the first week.

Dressing babies is at the discretion of the transport nurse. In general, follow the dressing routine the baby is currently receiving, unless there is a clinical or technical reason to change.

Some babies are at particular risk of hypothermia and extra care and attention should be given to their temperature management

- **Extremely immature babies** should receive the minimal handling required to safely stabilise them for transfer. Transport further challenges their thermo-homeostasis by obligating transfers between incubators and multiple procedures. Meticulous attention to detail of temperature management is essential.
- **Gastroschisis babies** (see also gastroschisis section page 7) are prone to heat loss from the exposed bowel, and from lying in serous fluid that has exuded from the defect. Consider the following:
    - Nurse the baby in a Vi-Drape bag tied at the armpits.

CNS/Encephalopathy
EMNODN has adopted the BAPM Framework for Practice regarding Therapeutic Hypothermia for Neonatal Encephalopathy. This contains comprehensive guidance on care of these infants.

Where encephalopathy is suspected in an infant and therapeutic hypothermia may be indicated, referral via CenTre call handling service to a cooling centre should not be delayed. Early identification is essential so that therapeutic hypothermia is achieved by 6 hours of age.

Therapeutic cooling, whether passive or active, should be started by the referring unit, following the TOBY Guidelines. Continuous rectal temperature monitoring should ideally be used to guide cooling (and certainly if providing active therapeutic hypothermia).

Liver/Jaundice
Where exchange transfusion is indicated consideration should be given to undertaking this prior to transfer to avoid delay in lowering toxic bilirubin levels. However this may not always be possible, especially in smaller units with fewer resources. In such cases a time critical transfer to the nearest Level 3 NICU is required.

Sepsis
Infants where infection is an element in the differential diagnoses, should have a septic screen before starting antibiotics, before transfer.

Pain Relief
Appropriate pain relief should be given where required (NB. Commencing opiates in non-ventilated babies prior to transfer may obligate intubation for the journey)

General Management Principles for Surgical Problems and Transport
Babies in this category include those with clear surgical diagnoses (T.O.F., gastroschisis, etc) and those whose referral includes the need for surgical assessment (e.g. distended abdomen).

All non-surgical units have been provided with a 'surgical box' by CenTre that contains stabilization advice for common surgical problems; equipment such as vi-drape bags and replogle tubes; and parent information leaflets. It is the responsibility of each unit to check and maintain stock levels in this box.

a. Consent

Valid consent can only be obtained by the surgeon who will do the procedure or is competent at doing 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.
- Another person to whom a court has given parental responsibility.

If a person giving consent will be at the surgical centre before surgery is required, then inform this person to keep this arrangement, so that consent may be obtained by the surgeon in a timely manner. Also obtain details of phone numbers where the appropriate person(s) may be contacted by the surgical team if surgery is needed before the family are able to travel to the surgical centre.

Document this clearly in the notes.

If surgery is required following transfer, but before a valid consent-giver is present in the receiving centre it will be necessary for the referring and receiving centre clinicians, including the surgical team, to discuss options (such as telephone consent).

Gastroschisis
Anticipate substantial fluid losses from exposed bowel. They may need 20-60ml/kg in the first six hours on top of maintenance. Assess volume status frequently by measuring losses in plastic bag, blood pressure, toe/core temperature gap trend and by estimating capillary refill time. Replace volume with 0.9% Saline in 10ml/kg aliquots given over 30-60 minutes. This should be instituted prior to arrival of the transport team, who will continue this regimen.

Nurse in Vi-Drape bag, secured under the arms. No nappy required.

Inspect the defect for signs of ischaemia (dusky or black, poorly perfused bowel), and discuss these by telephone with the surgical centre and transport team

Position the infant to avoid twisting or tension on the blood supply to the exposed gut.

Congenital Diaphragmatic Hernia
The standard approach is to ventilate and muscle-relax infants with CDH, especially if requiring transfer to another centre.
Place a large-bore (Min. 10 FG) naso-gastric tube on free drainage with regular aspiration to decompress the gut.
Discuss detailed pre-transfer management with Transport Consultant & receiving centre.

Oesophageal Atresia/Tracheo-Oesophageal Fistula
Place a replogle tube in blind end of oesophagus. Nurse infant head up. Ensure secretions are not allowed to build-up in the proximal oesophageal pouch by application of continuous low pressure suction (5-10cm/H_2O). In addition the replogle tube must be flushed by instilling a small amount of saline (0.5mls) every 10-15 minutes to loosen secretions and maintain patency.

Ideally, try to avoid ventilating, bagging or CPAP in 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 significant gut distension.

Gastro-Intestinal obstruction (including NEC/perforation/ileus, etc)
Place a large-bore naso-gastric tube on free drainage with regular aspiration. Replace NG losses if over 20ml/kg/day. Obtain abdominal X-Ray. Meticulous fluid balance should be kept.

5. Documentation & Communication

Effective transfer between units depends upon good communication between the referring, receiving and transport teams.

Written
The following minimum information should be available to the receiving team for all transferred infants, including back transfers. This is not an exhaustive list, but an indication of categories to be covered.

- BadgerNet discharge summary letter
- Maternal history
- Family/social history
- Pregnancy
- Delivery
- Resuscitation at birth
- Infant diagnosis list – previous and current
- Systems-based summary of problems and treatments
- Results of tests and investigations, particularly clinically important and recent routine tests
- Recent and other relevant X-Rays and scans
- Current drug and fluid therapies, including details of doses and timing
- safeguarding concerns
- Current treatment and care/stabilization prior to transfer
- Any outstanding clinical issues the receiving unit will need to deal with

Verbal
Transfer of patients between units can be logistically complex. It is essential that communication between referring, receiving and transport teams is concise, clear and unambiguous. All transport-related communications should take place via the CenTre call-handling service (0300 300 0038).

Handover from referring team to transport team and from transport team to receiving team should be in the form of a single multidisciplinary handover conducted using a structured approach (eg. SBAR).

Other
All babies should have two name labels with name, DOB and NHS number attached for transfer.

6. Family Care

Transfer between units is always a source of stress and anxiety for families. The referring, receiving and transport teams can take steps to minimise this.

Ensure parents are informed as early as possible that transfer is needed or being considered. This may be before birth where there is a predictable need for postnatal transfer. Where an infant is transferred for specialist care the probability of return transfer to the local unit should be raised from the earliest stage. Consent for capacity transfers remains the responsibility of the referring unit and should be obtained/confirmed prior to referral to the transport team.

Offer assurance that all units have fully trained and competent staff.
Depending on circumstance, parents may benefit from visiting a receiving unit in advance.

Give the parents an information pack regarding the receiving unit if available (all units have parent information leaflets as does the team)

The transfer of the parents should be considered alongside the transfer of the baby. If feasible the transport team will support at least one parent accompanying their child to the receiving unit. This depends on the parent being fit enough to look after themselves.
For mothers who are still in-patients under care of adult services (maternity or other) then that service should make arrangements to transfer the mother accordingly.

The transport service cannot guarantee availability of accommodation for parents at the receiving unit. This is something that should be discussed between the referring unit and the receiving unit.

NB. There may be occasions, such as the recent COVID Pandemic, when parent access to the ambulance will be restricted/prohibited. In such circumstances appropriate instructions/advice will be made available.

7. Failure to Stabilise

If the baby remains extremely 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:

a. Is the situation hopeless? There should be a discussion between the Transport Consultant and the Consultants in the referring and receiving centres, attending transport team and local nursing staff.

   - If this is the case then it may be most appropriate for the baby to die in the referring centre with the parents present and close to the family/friends.
   - It may be necessary for the transport team to prolong their stay to help with the palliative care process, but this will be determined by the needs of the referring centre.

b. Is there a therapy available at the end of transfer which might appropriately be used to retrieve the baby in extreme circumstances? Examples might include ECMO. Transfer for such tertiary facilities should only 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.

c. Is the referring unit able to continue caring for the baby for a period, on the understanding that the transport team will attend again at a later point and attempt transfer when the baby is more stable?