TRANSPORT AND REFERRAL

DEFINITION
Transfer of critically ill newborns from hospital of birth to a tertiary care facility for ongoing intensive care or surgical/cardiac assessment, or back from tertiary or secondary care facility to hospital of birth


INDICATION
• Preterm babies requiring intensive care not available at base unit
• Babies requiring:
  • surgical care or review
  • cardiology review or care
  • drive-through surgical procedures
  • diagnostic procedures (e.g. CT scan, MR scan, contrast study)
• return transfer for ongoing care

RETRIEVAL PROCESS
Communication
Referring centre
• Make decision to transfer with parents’ agreement
• Locate NICU/PICU bed or contact cot locator bureau for cot
• Provide clinical details to Newborn Transport Service (NTS)/receiving centre/surgeon
• If baby deteriorates further, inform NTS/receiving unit
• Document advice given/received
• Prepare copy of baby’s notes, X-rays and transfer letter
• Obtain parental consent for transfer
• Obtain sample of mother’s blood (if required)

Receiving centre
• Ensure consultant and NICU/PICU co-ordinator agree to accept referral
• Transport team to give details of management before departing for receiving centre

Newborn Transport Service (NTS)
• Ensure consultant agrees for NTS to carry out transfer
• Inform NTS of transfer
• Give clinical details, interventions and medications
• NTS will organise ambulance and response time
• NTS will ensure appropriate staff and equipment available for transfer

Parents
• Update with plan of care
• Ensure parents aware of reasons for transfer and that it warrants the upheaval and added risks
• Give information about receiving unit including contact number and map
• Photographs of baby
• Determine method of feeding
• Show baby to parents before departure
• Ensure mother is transferred to be near to baby as soon as possible
• Ensure baby is transferred back to referring hospital as soon as possible

**STABILISATION BEFORE ARRIVAL OF NTS OR BEFORE TRANSFERRING**
• Preparation for transport begins as soon as decision made to transfer baby
• Ensure X-rays are sent with baby
• Ensure all tubes and lines are very securely taped
• Change underwater seal drains to Heimlich flutter valve
• Ensure there are TWO reliable IV access sites
• Prepare extra fluid boluses for gastroschisis and septic babies

**Monitoring**
• Monitor temperature throughout stabilisation process and transit
• Document temperature before and after stabilisation, on arrival back at retrieval unit and throughout transport process
• Check blood glucose
• Monitoring for transit see below

**SPECIAL CONDITIONS**

| Always discuss baby's clinical condition with surgical team (if appropriate) to finalise management plan before and during transport |

**Necrotising enterocolitis**
• Largest possible naso- or orogastric tube on free drainage
• Nil-by-mouth
• IV fluids
• Check clotting and consider administration of FFP/extra vitamin K
• Antibiotics:
  ◦ benzylpenicillin, gentamicin and metronidazole (see Necrotising enterocolitis guideline) or according to local protocol
• If umbilical artery catheter (UAC) in-situ, do not remove
• AP and lateral shoot-through X-rays if indicated
• If hypotensive or acidotic, ventilate

**Oesophageal atresia/tracheo-oesophageal fistula**
• Largest possible naso- or orogastric tube
  ◦ on continuous drainage and aspirated at least every 10 min to keep pouch empty
• Suction mouth with standard suction catheter if required
• Nurse prone with head tilted

**Abdominal distension or suspected bowel obstruction**
• Largest possible naso- or orogastric tube
  ◦ on free drainage and aspirated regularly
• Document amount and type of aspirate
  ◦ if aspirate >20 mL/kg, replace with sodium chloride 0.9%
• IV fluids, and correction of shock
• AP (and, if perforation suspected, lateral shoot-through) X-rays
• Do not instrument anus
• Nurse in supine position
• Ventilate if hypoxic or significant abdominal distension present

**Congenital diaphragmatic hernia**
• Do not use bag and mask ventilation
• Intubate and ventilate
  ◦ compliant lung ventilation to avoid barotrauma or pneumothorax (no hyperventilation)
  ◦ ventilate in 100% oxygen regardless of saturations
largest possible naso- or orogastric tube on free drainage
- Aspirate regularly at least every 10 min to decompress stomach
- Keep baby well sedated and paralysed if fighting ventilator
- Surfactant not usually indicated (see Surfactant guideline)
- Keep head tilted upwards where possible (never allow head down position)
- Observe for pneumothorax (unaffected side)

**Pneumothorax/pneumomediastinum**
- Pneumothorax not under tension does not require drainage
- Keep saturations high
- Tension pneumothorax requires drainage
- If pneumomediastinum present, place infant in ambient oxygen concentration of 100% to enhance absorption of gas collection

**Choanal atresia**
- Provide oropharyngeal airway
- Do not feed for at least 2 hr before transfer
- Observe breathing pattern during transfer

**Pierre Robin micrognathia**
- If respiratory distress, insert oropharyngeal or nasopharyngeal airway
- Discuss endotracheal intubation with referring or receiving consultant before any attempt is made; expect to seek help from an experienced anaesthetist
- Airway patency can be improved by nursing and transferring, in prone position

**Neural tube defects meningocele, encephalocele**
- If sac ruptured, apply sterile dressing
- Nurse in prone position to prevent pressure on lesion
- Cover back with cling film to prevent stool contamination
- IV antibiotics: amoxicillin and gentamicin

See also Gastrochisis and Cyanotic congenital heart disease guidelines

**PACKAGING, MOVING AND OTHER ISSUES**
- Move baby into transport incubator
- Ensure smooth transfer and minimise heat loss
- Identify staff responsible for:
  - transferring baby from incubator to transport incubator
  - infusion lines
  - opening and closing incubator doors
- Inform receiving unit of baby’s condition and predicted time of arrival
- Mother may accompany only if baby stable and at discretion of NTS transport team

**DURING TRANSIT**
- In ambulance:
  - secure transport incubator
  - mains or battery supply
  - oxygen and air supply
  - Minimise handling: if any handling required, stop ambulance in a safe place
  - Avoid hypothermia by minimising interference (see Hypothermia guideline)

**Monitor**
- Heart rate, respiration, blood pressure and temperature continuously
- Record readings every 15 min and note type and volume of infusions
- If central access used, ensure umbilical stump visible and observe for any bleeding
- Monitor peripheral IV site(s) for any leakage and patency
- Ensure any peripheral arterial line site visible
AT RECEIVING UNIT

- When moving baby from transport incubator to incubator, identify staff responsible for:
  - transferring baby from transport incubator to incubator
  - infusion lines
  - opening and closing incubator doors
  - Hand over care to medical and nursing staff
  - Photocopy all transport and referring documents and give to receiving team. **DO NOT** leave receiving unit until this has been done as you are asking them to be responsible for ongoing care and part of transport of baby
  - Give receiving team X-rays/disk
  - When baby settled, check and document blood gases, BP, temperature and blood glucose
  - **Check concentrations of all parenteral solutions to be sure of actual dose of medication baby is receiving**
  - Inform referring centre and parents of safe arrival of baby
  - Complete documentation and provide receiving unit with photocopy before you depart

**Do not leave a baby at a unit without all necessary documentation. It is not acceptable to fax information to them at a later hour or date**

ON RETURN TO BASE

- Stock up equipment bag
- Check transport incubator
- Replace oxygen and air cylinder if needed
- Complete documentation

EQUIPMENT FOR TRANSFER

**Check all equipment daily and prepare before use**

- Transport incubator
- Ventilator
- Gas cylinders
- CPAP
- Incubator oxygen
- Suction
- Humidification device
- Thermoregulation equipment, including mattresses
- Self-inflating bag-valve-mask

**Monitoring facilities**

- Heart rate
- Respiratory rate
- Saturations
- Invasive blood pressure
- Temperature toe and core
- Glucose monitor
- Infusion pumps: 6 for ICU and 3 for SCBU babies

**Emergency drugs**

- Sodium bicarbonate 4.2% (or 8.4% diluted 1:1)
- Adrenaline 1 in 10,000
- Glucose 10%
- Sodium chloride 0.9%
Equipment bag
- Camera
- Documentation
- Parent information leaflet

- Intubation
  - laryngoscopes
  - endotracheal tubes (ETT) 2.5 mm to 4 mm
  - introducers
  - hats and ties/clips for ETT
  - scissors

- Cannulation
  - selection of cannulae (Jelco 24 g, Insytes with or without wings 24 g, Neoflons 24 g)
  - strapping
  - dressing packs
  - Sterets
  - cleaning lotion

- Umbilical catheterisation
  - See Umbilical venous catheterisation and Umbilical artery catheterisation guidelines
  - arterial catheters
  - venous catheters
  - forceps
  - probes
  - sutures
  - cord ties
  - zinc oxide tape
  - non-alcohol containing cleaning lotion

- Thoracocentesis
  - 21 G green butterfly (can use blue to aspirate air easily and reduce pain)
  - small bottle of sterile water
  - selection of chest drains (size 8 ch to 12 ch)
  - dressing packs
  - scalpel
  - Spencer-Wells forceps
  - clamps
  - syringe and needles
  - local anaesthetic (lidocaine 1%)
  - Steristrips
  - Tegaderm
  - flutter valves