

## Local Guideline



John Hunter  
Children's Hospital  
CHILDREN, YOUNG PEOPLE AND FAMILIES



Health  
Hunter New England  
Local Health District

## Surgery-Preparation and Care of Infant in NICU

<b>Sites where Local Guideline applies</b>	Neonatal Intensive care and Operating suites JHH
<b>This Local Guideline applies to:</b>	
1. Adults	No
2. Children up to 16 years	No
3. Neonates – less than 29 days	Yes. Approved by CYPFS 26/09/2017
<b>Target audience</b>	Clinicians in NICU and Operating suites who care for neonates requiring surgery
<b>Description</b>	Provides information for clinicians to prepare infants requiring surgery

[Hyperlink to Guideline](#)

<b>Keywords</b>	equipment, monitoring, NICU, post-operative, pre-operative, ventilation
<b>Document registration number</b>	JHCH_NICU_16.05
<b>Replaces existing document?</b>	Yes
<b>Registration number and dates of superseded documents</b>	JHCH_NICU_18.05 May 2011

**Related Legislation, Australian Standard, NSW Ministry of Health Policy Directive or Guideline, National Safety and Quality Health Service Standard (NSQHSS) and/or other, HNE Health Document, Professional Guideline, Code of Practice or Ethics:**

- NSW Health Policy Directive 2014\_036 Clinical Procedure Safety  
[http://www0.health.nsw.gov.au/policies/pd/2014/pdf/PD2014\\_036.pdf](http://www0.health.nsw.gov.au/policies/pd/2014/pdf/PD2014_036.pdf)
- NSW Health Policy Policy Directive 2010\_058 Hand Hygiene Policy  
[http://www0.health.nsw.gov.au/policies/pd/2010/pdf/PD2010\\_058.pdf](http://www0.health.nsw.gov.au/policies/pd/2010/pdf/PD2010_058.pdf)

<b>Prerequisites (if required)</b>	N/A
<b>Local Guideline note</b>	This document reflects what is currently regarded as safe and appropriate practice. The guideline section does not replace the need for the application of clinical judgment in respect to each individual patient but the procedure/s <b>require mandatory compliance</b> . If staff believe that the procedure/s should not apply in a particular clinical situation they must seek advice from their unit manager/delegate and document the variance in the patient's health record.
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## Surgery-Preparation and care of infant in NICU JHCH\_NICU\_16.05

Note: Over time links in this document may cease working. Where this occurs please source the document in the PPG Directory at: <http://ppg.hne.health.nsw.gov.au/>

### RISK STATEMENT

*This local guideline has been developed to provide guidance to clinical staff in NICU to assist in preparing an infant for surgery, transfer to theatre and post-operative management. It ensures that the risks of harm to infants requiring surgery are identified and managed.*

*Any unplanned event resulting in, or with the potential for injury, damage or other loss to infants/staff/family as a result of this management must be reported through the Incident Information management System and managed in accordance with the Ministry of Health Policy Directive: Incident management PD2007\_061. This would include unintended injury that results in disability, death or prolonged hospital stay.*

**Risk Category:** Clinical Care & Patient Safety

### GLOSSARY

Acronym or Term	Definition
CPAP	Continuous Positive Airway Pressure
IV/PICC	Intravenous/ Percutaneous Inserted central catheter
NBST	Newborn Screen Test
OG	Orogastric tube
PACS	Picture Archival Communication System (XRAYS)
PN	Parenteral Nutrition
UPS	Un-interrupted power supply
UVC	Umbilical Venous catheter

### OUTCOMES

1	Efficient and expert neonatal care for an infant pre, intra and post-operatively.
2	Initial management to minimise hypothermia and maintain Airway, Breathing and Circulation.
3	Fluid and electrolyte balance is maintained
4	Surgery is performed when the infant's condition has been optimised through stabilisation
5	Post-Operative analgesia is provided as required for effective pain management
6	Parents will be informed, educated and supported throughout the infants stay
7	Monitoring is effective at all times to recognise any change in condition
8	Monitoring is effective at all times to recognise any change in condition

## Surgery-Preparation and Care of Infant in NICU

### - One Page Summary and Checklist

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#### [Rationale/Background](#)

##### [Pre-operative care](#)

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- Thermoregulation
- Antibiotics
- Observations
- Hydration
- Pain relief
- NBST
- Central Lines
- Safety
- Transfer
- Parents
- CPAP
- Ventilated Infants


##### [Intra-operative care](#)

##### [Postoperative care](#)

- Thermoregulation
- Respiratory stability
- Observations
- Pain Management
- Hydration
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- Documentation
- Communication
- Post -Operative medication
- Medical review
- Parents/family


#### [Appendix 1 Theatre Checklist](#)

#### [Appendix 2 Paediatric pre -procedure checklist A \(Ward \) & B \(Theatre\)](#)

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**GUIDELINE**

This Guideline does not replace the need for the application of clinical judgment in respect to each individual patient.

**Rationale**[Top](#)

The JHCH Neonatal Intensive care Unit cares for surgical infants requiring different types of surgery. The need for up to date, concise information on how to care for these infants is required. The delivery of this care will provide support for the infant pre, intra and post-operatively.

**Background**

Surgical treatment for neonates has been rapidly developing over the last 50 years<sup>1</sup>. Neonatal surgery has now become an independent branch of general surgery, which requires collaboration between paediatric surgeons, neonatologists, anaesthetists, pathologists, radiologists and neonatal nurses. There has been a steady improvement in the outcomes of most neonatal diseases requiring surgery mainly due to a better understanding of the physiology of neonates, the advances in fluid management, nutrition, mechanical ventilation, surgical techniques and the transport of the neonate to theatre and also pain management<sup>1</sup>.

**Preoperative Care**[Top](#)

It is important for the infant to be in a stable condition prior to surgery. This applies to infants booked for routine surgery as well as emergency or semi-elective cases. All infants in NICU requiring surgery are transported to theatre on a giraffe bed. The following points need to be confirmed prior to transfer

- Parents have given informed consent and documentation signed
- The pre-operative preparation checklist is completed-see Appendix 2
- Identification bands are correct and attached to infant on 2 different limbs.
- **Check Oxygen and Air cylinders are full and functioning.**
- Ensure the t-piece device (Neopuff) is working and that a self inflating (Laerdel) bag and appropriately sized mask accompany the infant to theatre.
- The Infant's medical records and charts must accompany the infant to surgery, including any x-rays not on PACS<sup>2</sup>
- Electrolytes are measured and within appropriate parameters
- Blood sugar level as infant Nil by mouth and on IV fluids
- Any pre-operative medication is given as prescribed by the surgeon or anaesthetist
- Observation chart documenting pre surgery observations, intake and output.
- The nurse accompanying the infant to theatre needs to be dressed in theatre scrubs and wear appropriate PPE
- Blood is cross matched and available as per requirements

### Surgery-Preparation and care of infant in NICU JHCH\_NICU\_16.05

A box labelled "Surgery" can be found in the unit which contains items that may be required in theatre. This includes protocols, guidelines thermoregulation support, and a quick checklist of reminders. See Appendix 1.



**Giraffe Bed used to transport Infant to Theatre**

**Monitoring:** Is achieved during transfer by a detachable unit - IntelliVue X2 (below) from the Phillips MX800 monitor or a portable oximeter or Massimo Rad 5 unit (below right). Alarms may need to be adjusted to ensure oxygen saturations are targeted. The battery charge for the Phillips MP70 is approximately 3 hours. When the monitor is detached the battery charge can be read in the lower right hand side of the monitor after 10 seconds and will provide a running display of battery life. Anaesthetists' may prefer the Massimo for its longer battery life if using this monitoring throughout the intra- operative period.

**Detachable IntelliVue X2 for theatre**



**Portable Oximeter (Rad 7's) used in JHCH NICU**



Note: Manuals for equipment discussed in this guideline located in NICU, Technical Officers Room

**Thermoregulation:** The infant needs to maintain his/her temperature within an acceptable neutral thermal zone thus decreasing oxygen and glucose consumption. The neonates' susceptibility to temperature instability, particularly during theatre, needs to be recognised and understood in order to appropriately manage and limit the effects of cold or heat stress<sup>3</sup>.

The NICU nurse accompanying the neonate to theatre has an important role in advocating for appropriate thermoregulation measures to be instituted.

Strategies that can be used to assist in temperature maintenance include:

- Request theatre staff to increase the theatre temperature
- Use of a giraffe bed with the top closed and the infant covered in warm blankets
- When transferred to theatre bed, position giraffe cot in anaesthetic room, plugged in and turned on.
- Ensure that theatre staff have set up convective warmer 'bear hugger' to provide heat for the infant intraoperatively where indicated
- Spare linen should accompany the infant to theatre to replace dirty and wet linen prior to transfer back to unit. Warm the linen in the warming cabinet prior to use.
- Extra care is required for premature infants as small immature infants are less able to regulate body temperature<sup>4</sup>
- Alert theatre staff if infant's temperature appears to be out of the normal range
- Use of a space blanket (not under a radiant heat source).

**Antibiotics and other medications:** The use of antibiotic coverage prophylactically may be necessary prior to /or during theatre.

Most neonatal antibiotic and other medications protocols can be accessed on the PPG through a computer in theatre.

**Observations:** Obtain baseline observations preoperatively. This provides a baseline to identify any change in the infant's condition.

- Heart rate
- Respiratory rate
- Oxygen saturation
- Blood pressure and weight also need to be recorded prior to theatre
- Temperature
- Pain score

**Hydration:** Fluid and electrolyte therapy is an important component of the supportive care required by an infant preparing for surgery, this includes:

- Intravenous (IV) access availability and patency. If the baby has a PICC line or UVC a peripheral cannula should be inserted prior to theatre.

### **Surgery-Preparation and care of infant in NICU JHCH\_NICU\_16.05**

- Discuss with anaesthetist preoperatively preferences for IV fluids. Parenteral nutrition is stopped prior to theatre and replaced with glucose and sodium chloride solution. Do not add potassium.
- All lines should be accurately labelled
- Insert an Fg 8 oro-gastric tube on free drainage to alleviate gastric distension. To prevent aspiration of gastrointestinal contents the infant should be fasted prior to theatre for 4 hours if receiving breast milk and 6 hours if receiving formula. Discuss with anaesthetist/surgeon.
- Ensure urinary output is adequate at 1-2 ml/kg/hour<sup>6</sup>.

**Pain relief:** The management of pain must always be considered and analgesia administered if ordered pre-operatively. The amount and type will depend on the baby's condition. Assess pain response using the N-Pass score. Pain relief may be managed using the Vienna protocol. Refer to the CPG "Assessment and Management of Pain in the Neonate" JHCH\_NICU\_03.04 to assist in the assessment and management of pain. The NICU Nurse should advocate for appropriate analgesia intra-operatively.

**Newborn Screen Test (NBST):** Ensure the newborn screen test has been completed prior to theatre in the event of blood products being administered to the infant. Document in the notes & refer to "[Newborn Screen Test in NICU](#)" CPG -JHCH\_NICU\_16.02

**Umbilical Lines / Central Lines:** All lines should be assessed for placement and security prior to transfer.

**Safety:** Secure lines and leads prior to transport.

**Transfer:** The infant is transferred to and from theatre with the neonatal nurse and assistance from the medical staff or anaesthetist. A wards person from theatre and NICU TA's may also assist. The nurse must observe her patient and monitoring throughout the transfer.

**Parents:** Keep parents informed of infant's condition, reassure and provide support. Ensure the parents are shown the NICU waiting room<sup>7</sup>. Parents may wish to walk with their infants to theatre. Ensure the social worker is aware to offer support as needed.

**CPAP:** Infants on CPAP (Continuous Positive Airway Pressure) ventilation will generally be either intubated in NICU prior to transfer or receive mask CPAP via the Neopuff during transit.



## **Additional preparation for Intubated and ventilated Infants**

**Peripheral arterial line:** May be required. Ensure the line is strapped adequately. Monitoring of blood pressure is achieved via monitors in transit and in the operating theatre by the anaesthetists. Ensure 'ICU Medical' cable is in surgical box as Phillips cable does not fit into theatre monitor.

**Intubation:** Depending on the type of surgery and the stability of the infant the neonatologist may elect to intubate prior to surgery, or the Anaesthetist may request intubation prior to theatre.

Ensure:

- Adequate pain relief is administered for elective intubation.
- Adequate airway and respiratory support is maintained by monitoring arterial blood gases and pulse oximetry.
- Endotracheal tube (ETT) is securely strapped to prevent movement.
- Spare ETT and Neobar should be taken with the baby to theatre
- Spare size Fg8 oro-gastric tube is taken with the baby to theatre

**Ensure that the short blue tubing piece is connected to the inspiratory circuit to provide additional length for easy manoeuvring during transport of the infant on the ventilator to theatre. Use a new sterile pack to obtain this piece.**

### **Abdominal Wall defects:**

If relogyle tube or larger O/G tube insitu do not remove.

For specific management of infants with abdominal wall defects refer to [“Gastroschisis in the Neonate” CPG- JHCH NICU 16.03](#) and [“Omphalocele in the Neonate” CPG - JHCH NICU 16.04](#)



## Intraoperative Care

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Once the infant is checked into theatre, the NICU nurse must assist theatre staff to transfer the baby to the operating table, ensuring all lines are well secured during movement.

Ensure the infants' incubator is parked safely in the anaesthetic room and turned on.  
Check the Oxygen and Air cylinders are turned OFF.

**Care of the infant is transferred to the Anaesthetist for the intra-operative period however the neonatal nurse should remain in theatre if the surgery is major i.e. opening of a body cavity or if requested by the anaesthetist.**

The role of the NICU nurse in theatre is to assist as requested to perform observations, operate NICU equipment e.g. infusion pumps, administer fluids and medications as ordered and collect blood samples. The NICU nurse may also be required to call for further assistance from Neonatologists or other NICU staff.

The NICU nurse remains an advocate for the infant in theatre as well as a resource for theatre staff to ensure appropriate thermoregulation and to promote a safe environment for the infant.

The Anaesthetist will hand over the infant's care back to NICU staff following surgery, when the infant is stable.

Following surgery contact NICU to inform the nurse in charge of the infant's condition and ventilation requirements.

Phone numbers:

Num2/Team Leader	55987
NNP/Registrar	23171
NNP/Registrar	23172

## Post-Operative Care

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**The infant returns directly to NICU following surgery. The Neonatal Nurse and Anaesthetist accompany the infant back to the unit and then stabilise the infant in NICU with the help of neonatal staff**

**Thermoregulation:** On return to unit ensure the infant is well supported to maintain his/her temperature. This may require increasing the crib temperature or putting the infant on servo control to assist in rewarming. Monitor temperature regularly on return to unit<sup>2</sup>.

**Respiratory Stability:** Depending on the type of surgery the infant might return to the unit intubated. Ensure adequate ventilation settings are set and check arterial blood gas upon arrival back to unit. See guideline number "5-5.1.4(a)" Assisted ventilation for care of ventilated baby". Infants who are intubated in theatre and have not had a chest x-ray require one on return to the NICU to confirm the ETT is in the correct position.

**Observations:** Monitor closely and document observations hourly.

**Pain Management:** Assess pain response using the N-Pass score. Pain relief may be managed using the Vienna protocol. Document accurate pain score to monitor requirement for pain relief. Refer to the CPG "Assessment and Management of Pain in the Neonate" JHCH\_NICU\_03.04 to assist in the assessment and management of pain. On rare occasions the Anaesthetist may insert a pleural catheter for administration of local anaesthetic infusions. Ensure there are written orders in the baby's notes or medication chart for ongoing care.

**Hydration:** Monitor hydration status focusing on measures to promote fluid and electrolyte balance<sup>9</sup>. This includes:

- Monitor serum electrolytes and BSL as ordered.
- Evaluate and document fluid balance and measure any wound drainage, gastric aspirate etc.
- Monitor urinary output to ensure infant is adequately hydrated. Inform medical staff of any change in output.

**Wound Observation:** Check surgical wound on return to unit, ensure the wound dressing is intact and nil further bleeding has occurred on moving the infant. If wound review required request the CNC for Surgery - pager: 5954.

**Documentation:** Ensure documentation is thorough and include any extra orders that were undertaken in theatre. Ensure that the surgeon's postoperative orders are documented and followed<sup>2</sup>. Documentation is important to reflect the period the infant is in theatre.

**Communication:** On return of a patient to NICU, a medical and accepting nursing staff member should be in attendance to get "hand-over" from the operative care team. During this time specific instructions may be given, these should be recorded in the patient's notes.

**Post-Operative Medication:** Ensure medication orders are clear and followed-check stock available

**Medical review:** A full review of the patient should be performed by junior or senior medical staff when a patient arrives back in the NICU, changes to ventilation, fluid management or therapeutic interventions may be made at this review

**Family/Parents:** Reunite infant with parents as soon as possible. Facilitate the surgeons or doctors informing parents of surgery outcome.

**REFERENCES:**

1. Pierro, A.2006.Gastrointestinal Surgery in the Neonate. *Current Paediatrics*. 16, 3,153-164
2. Harres, A. 2007. Minimally Invasive Neonatal Surgery. *Perinatal Neonatal Nursing*. 21, 1, 39-49.
3. Merestien, G, Gardner, S. 2011. Handbook of Neonatal Intensive Care. St Louis. Mosby Elsevier, p117-123
4. Smith,J, Alcock,G, Usher,K.2013. Temperature measurement in the preterm and term neonate. A review of the literature. *Neonatal Network*. 32(1) p.16-25.
5. Lan, T, Vitenghoff, E, Nobohara, K, Farmer, D, Lee, H. 2014. Surgical site Infections in neonates and infants: is antibiotic prophylaxis needed for longer than 24 hours? *Paediatric Surgery International*.30 (6), 587-592.
6. Verklan, M, and Walden, M. 2010. *Core Curriculum for Neonatal Intensive Care Nursing*. 4th Ed, Elsevier Saunders, St Louis, Missouri
7. Taylor, E. 2007. Infant Perioperative Patients. *AQRN Journal*. 86, 5,843-847.
8. Gibbins, S. 2007. A Combined Approach to Pain Management in the Surgical Neonate. *Newborn and Infant Reviews*. 7, 3,171-174.
9. McAlbany, A and Popovich, D. 2007. Hirschsprung Disease. *Newborn and Infant Reviews*. 7, 3,152-154.

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**APPROVED:** NICU,Operational, Planning & Management Committee  
07/09/17  
Kaleidoscope Clinical Quality & Patient Care Committee  
26/09/17

**FEEDBACK**

Any feedback on this document should be sent to the Contact Officer listed on the front page.

## Appendix 1

### Theatre checklist

#### Ensure that you have:

- Consent: procedure and blood transfusion
- Pre-op checklist- include baseline observations and Pain score
- ID bands on two limbs, MRN sticker on oro-gastric tube
- Current Weight
- Monitoring equipment applied and secure
- Cross match available
- IV access- assess cannula for any signs of infection/extravasation
- Parenteral nutrition is changed to clear fluids- Glucose/sodium, not containing potassium
- NBST has been attended
- Change into theatre attire - surgical scrubs, hat and PPE
- All patient notes/medication charts/fluid charts/observation charts

#### On/In incubator:

- Oxygen and Air cylinders (Ask TAs for assistance)
- Extra blue tubing (short piece) connected to inspiratory limb (if ventilated infant)
- Neopuff and mask (and spare mask)
- Laerdel bag
- Suction tubing and catheters-size 10
- Masimo (Our detachable units have a max 3 hour battery life and cannot be charged in theatre)
- Servo control temperature probe
- 2 x extra syringe drivers (potential for dopamine/morphine/insertion of intra-arterial line)
- OT box containing:
  - Common Drug Protocols for theatre
  - Suction catheters: FG8 x2, FG10 x2
  - Size 8 oro-gastric tube
  - Scissors and Tape
  - Softban x3
  - Clear Fluid filter, chooks foot, fluid and medication labels
  - Blood Filter

- Arterial line equipment
  - fluids- 100ml normal saline 0.9%
  - 100u Hep Saline
  - 2x arterial stickers
  - 2 x 10ml syringes
  - 2 x 24g needles
  - minimal volume extension tubing,
  - 1x 50ml syringe
  - 3x arterial blood gas syringes
  - 3x non-luer lock 3 ml syringes
  - Transducer
  - arterial pressure tubing,
  - 3-way tap
  - Daytex arterial cable (fits into monitor in OT)-not Phillips
- Thermometer, spare ECG leads, Silver temp probe disk, Mepitac™

### **Gather appropriate for the baby:**

- ETT equipment
  - ETT appropriate size for baby + 1 size below
  - Introducer
  - Laryngoscope handle and blade
  - Pedicap
  - Neobar
- Hat/s
- Warm blankets and linen
- Spare weighed nappy

### **Once in OT**

- assist to transfer baby to theatre trolley and then move incubator into anaesthetic bay
- ensure oxygen and air cylinders are OFF
- plug in crib and switch on to ensure a warm environment following surgery and transfer back to nursery
- remain in theatre with infant to perform observations, operate NICU equipment e.g. infusion pumps, administer fluids and medications as ordered, collect blood samples
- contact NICU if extra assistance/consultation required from Neonatologist or other NICU staff
- Phone Nurse in charge to update upon conclusion to prepare for return to nursery

Phone numbers: NICU In charge: 55987 /NICU L3 desk: 14945

Appendix 2a HNEH Paediatric Pre-Procedure Checklist-Ward

HUNTER NEW ENGLAND HEALTH

PAEDIATRIC PRE-PROCEDURE CHECKLIST

PLEASE USE GUMMED LABEL IF AVAILABLE

SURNAME		UNIT NUMBER
OTHER NAMES		
ADDRESS		
DOB	M.O.	
HOSPITAL / WARD		



HNE018155

BINDING MARGIN - DO NOT WRITE

Indicate 'YES' with a tick (✓) NO with a cross (X) OR N/A		ALLERGIES / ADVERSE REACTIONS:
Give explanation, if required, in remarks column.		
<b>WARD PREPARATION</b>	<b>CHECK</b>	<b>REMARKS / VARIANCE</b>
Interpreter required		Language:
Identification & allergy bands attached to (attach to non-procedural limb):	ARM LEG	
Patients stated name & DOB confirmed with ID bands		
Staff verifies procedure, side & site with patient / parent / guardian		
Staff verifies identity with consent / request forms		
Consent completed (with no abbreviations) & signed by M.O and parent / guardian		If aged 14-16 years patient must sign own consent (it is prudent for this to be countersigned by parent/guardian).
Consent for blood transfusion indicated		
Operation site prepared		
Surgical site marked by Medical Officer		
Correct identification labels on current notes and in chart		
Current & previous medical records / imaging films available and correctly labelled		
Required pathology results available		
Anaesthetic assessment completed		
Does patient think they are pregnant		MAYBE
Relatives informed of approximate theatre time		Time advised:
Premedication given and recorded		
Pressure area risk score		
Pressure areas / ulcers present		Location:
Additional infection control precautions required		
Food last ingested	Time:	Date:
Fluids last ingested	Time:	Date:
Last voided or catheterised	Time:	
Urinalysis		
TPR / BP recorded		
Height & weight recorded		BMI:
Last recorded BSL (if applicable)		
Dentures : Upper <input type="checkbox"/>	Removed	
Lower <input type="checkbox"/>	Removed	
Denture container labelled (if applicable)		
Caps / crowns / plates / loose teeth		
Contact lenses / glasses / prosthesis removed		
Jewellery removed / taped		
Hair pins, cosmetics, nail polish and false nails removed		
Internal prosthesis / implants		
Anti-embolic stockings/ sequential calf compression in situ		
Valuables to security / relative prior to transfer		
Person to be contacted post-procedures if time permits	Name:	
	Contact number	
<b>SIGNATURE OF STAFF PREPARING PATIENT:</b> .....		
Print name: ..... Date: ..... Time: .....		
Designation: .....		

03/10 (March 2010)

HNEH030C

PAEDIATRIC PRE-PROCEDURE CHECKLIST

Theatre





## Appendix 3.

### Setting up the Fabian HFO® Neonatal Ventilator for Operating Theatre Use for Neonates going to and returning after Surgery

#### Background:

It is now possible for the Fabian ventilator to be used in operating theatres during neonatal surgery with safe delivery of anaesthetic agent using the Diamedica® Drawover Vaporiser. This configuration will have significant advantages for neonates going to surgery:

- Continued and uninterrupted ventilation using the Fabian HFO® from the NICU to OT and back to NICU without need for change of ventilators at any time.
- Ability to provide appropriate heated humidified gases throughout the patient journey - reducing adverse respiratory effects and helping with thermoregulation.
- Ability via the flow-sensor to detect patient effort and small changes in flow and volume.
- Ability to compensate for ETT leaks.
- Easy & early recognition of ETT blockage or dislodgement.
- Continued use of Assist Control (SIPPV) with VG (volume guarantee).

In preparation for a neonate going for surgery, following additional equipment will be required. The equipment is stored in a box labelled '**Equipment for Anaesthesia delivery in Theatre**' and kept in the Monitoring Section of the NICU Storeroom.

1. Diamedica® Drawover Vaporiser.
2. New blue, 22mm F - 15mm M, sterile inspiratory tubing **x 2 pieces**, taken from fresh tubing packs.
3. Black plastic scavenging shroud with attached tubing.

**NOTE:** When available, please inform one of the NICU technical assistants in advance to allow sufficient time to mount the equipment on the Fabian® ventilator.

#### Preparing the Fabian HFO®

##### Step 1:

- **NOTE:** When moving, setting-up and mounting the Diamedica® Drawover Vaporizer it must remain, as close as possible, in a vertical position. This will ensure no liquid anaesthetic agent leaks from the assembly or enters parts of the mechanism where it may affect output accuracy.
- Fit the blue, 22mm F - 15mm M, inspiratory tubing to the Diamedica® Drawover Vaporizer, as shown below. Ensure the sealing plug on the 22mm F connector is firmly seated.



Mount the Diamedica® Drawover Vaporizer on the right hand, patient side, support rail of the Fabian® ventilator and gently tighten the clamp as shown below.



**Step 2:**

- Wipe the black plastic scavenging shroud with Oxivir wipes and wait until dry.



- Check with the nurse and with help, disconnect the expiratory limb from the ventilator, and use gentle force to fit the black plastic scavenging shroud onto the tapered expiratory port. Once the scavenging shroud is in place, quickly re-connect the ventilator expiratory limb, as shown below.
- Coil the yellow scavenger hose and place it in a plastic bag.
- Hang the plastic bag containing the yellow scavenger tubing on the hook next to the ventilator





**Step 3:**

- Ensure that the **short blue tubing** piece is connected to the inspiratory circuit to provide **additional length** for easy manoeuvring during transport of the infant on the ventilator to theatre. Use a new sterile pack to obtain this piece.
- **NOTE:** As the patient circuit has been disturbed, the nurse is to check if the infant requires re-recruitment or adjustment of FiO<sub>2</sub>.

**Step 4:**

- **Turn on the air and oxygen transport cylinders ready for the journey to OT.**
- Transfer the black ventilator air supply hose from the wall air outlet to the cylinder supply.
- Transfer the white ventilator oxygen supply hose from the wall oxygen outlet to the cylinder supply.

**NOTE:** All other procedures and checklists for preparing a neonate for Theatre and Surgery remain the same and should be followed as per unit guideline.

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**Return to NICU:**

**Step 1:**

- Transfer the black ventilator air supply hose from the cylinder supply to a wall air outlet.
- Transfer the white ventilator oxygen supply hose from the cylinder supply to a wall oxygen outlet.
- **Ensure the air and oxygen transport cylinders are turned off to conserve medical gas.**

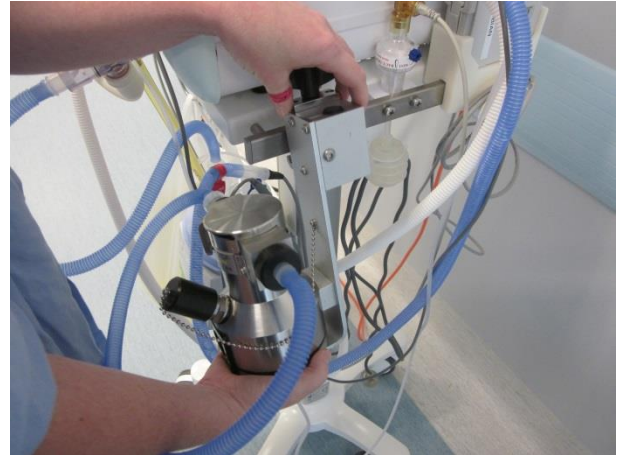
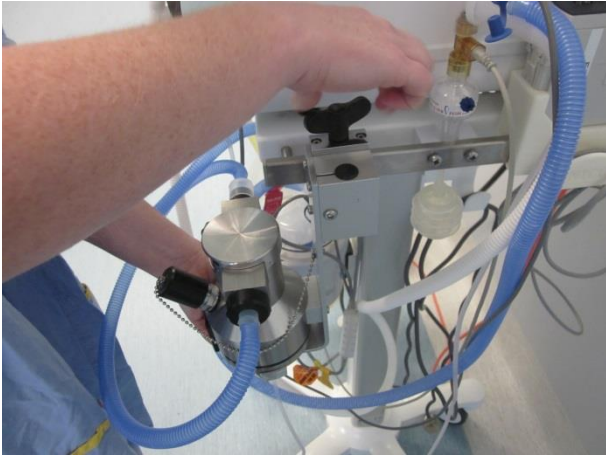
**Step 2:**

- Check with the nurse and with help disconnect the expiratory limb from the ventilator, remove black plastic scavenger shroud, as shown below, then quickly re-connect the expiratory limb.



**Step 3:**

- As the Diamedica® Drawover Vaporizer may contain Sevoflurane liquid on return from OT, seal the unit by, setting the control lever to the end stop below the 0% concentration mark. Loosen the clamp and unhook the vaporizer from the Fabian® ventilator, as shown below.



- **NOTE:** When moving, working on and storing the Diamedica® Drawover Vaporizer it must remain, as close as possible, in a vertical position. This will ensure no liquid anaesthetic agent leaks from the assembly or enters parts of the mechanism where it may affect output accuracy.

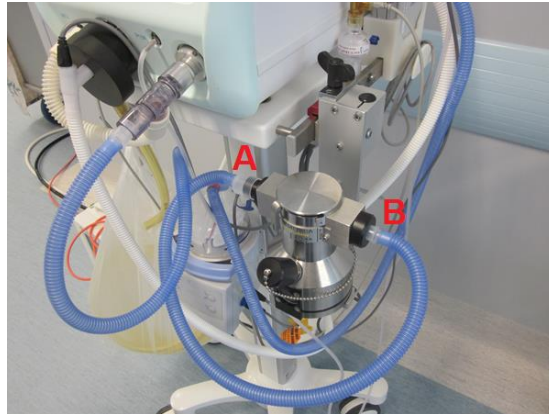
**Step 4:**

- Remove and discard the blue tubing then return the Diamedica® Drawover Vaporizer and the scavenger assembly to the box labelled '**Equipment for Anaesthesia delivery in Theatre**' which is kept in the Monitoring Section of the NICU Storeroom.

## Use of Drawover Vaporizer with the Fabian Neonatal Ventilator Checklist & Procedure for Anaesthetics Staff

### Arrival in OT:

The neonate requiring surgery will arrive in Operating Theatre in a GE Giraffe Omnibed or a Fisher Paykel Open Care Unit, either intubated and ventilated or accompanied by the Fabian HFO ventilator. The initial ventilator set-up, as shown below, has connections A and B linked by a separate tube.



### Step 1:

- Transfer the black ventilator air supply hose from the cylinder supply to a wall air outlet.
- Transfer the white ventilator oxygen supply hose from the cylinder supply to a wall oxygen outlet.
- **Ensure the air and oxygen transport cylinders are turned off once wall supply is established to conserve medical gas for the return journey to NICU.**

### Step 2:

- Ready the GE Aisys CS2 anaesthetic machine gas monitor module with a clean gas sampling line.
- Start a new case on the GE Aisys CS2 anaesthetic machine and select Local as the operating mode. Set the Bag/Vent switch to Bag and set the APL valve to minimum. This will silence all anaesthetic machine alarms and initiate a 200ml/minute oxygen flow to continuously flush the anaesthetic machine patient circuit.
- Obtain a 22 gauge IV cannula. Open the sterile pack, remove the stylet and discard safely into a sharps bin.
- Connect the IV cannula to the gas sampling line.
- Identify the access port at the 'Y' end of the ventilator tubing and gently insert the cannula through the 'duck-bill' such that the tip sits centrally against the metal guard on the flow-sensor, as shown below.



- Ensure that the cannula hub is pushed firmly to rest securely against the access port at the 'Y' piece as indicated below. The curl on the cannula is normal and ensures the sample point will stay in contact with the metal guard on the flow sensor.



- An EtCO<sub>2</sub> trace, observed on the GE Aisys CS2 anaesthetic machine patient monitor, signifies correct placement of the cannula.

**Step 3:**

- Remove the yellow tubing from the plastic bag and connect the yellow hand wheel to a suction inlet.
- Turn the suction on to a level where an audible sound can be heard from the black plastic scavenger shroud, shown below. This will ensure volatile agent scavenging is working.



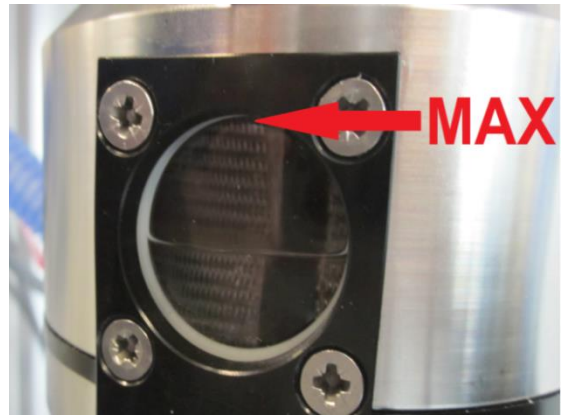
**Step 4:**

- To prepare the Diamedica® Drawover Vaporizer for filling, disconnect the blue ventilator tubing from one end of the vaporizer and turn the concentration adjustment lever to the mid position as shown in the pictures below.



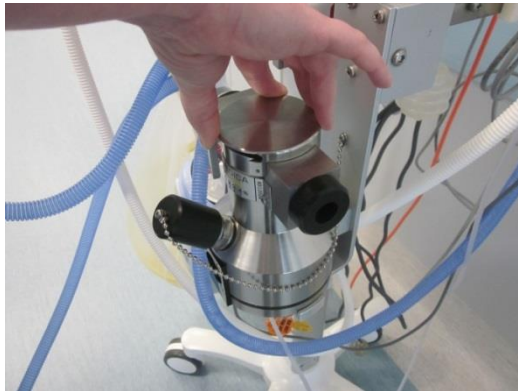


- To fill the vaporizer with Sevoflurane, as shown in the pictures below, remove the black dust cap and hold the nozzle of bottle firmly against the valve in the base of the filler assembly. Monitor the liquid level using the sight glass immediately below the filler assembly. The liquid reaching the top of the sight glass indicates maximum capacity. Cease filling as soon as the maximum is reached.



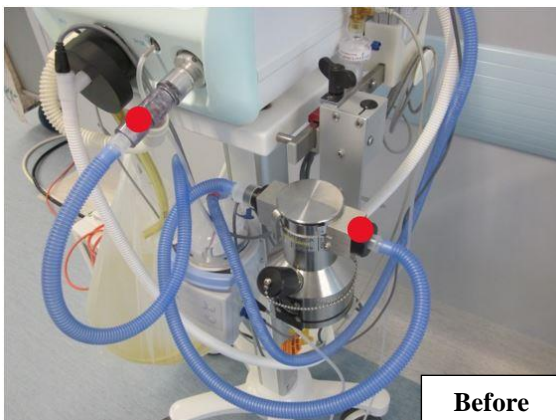
**Step 5:**

- Immediately after filling, replace the dust cap and ensure that the vaporizer concentration adjustment lever is set to the end stop, beyond the 0% graduation.

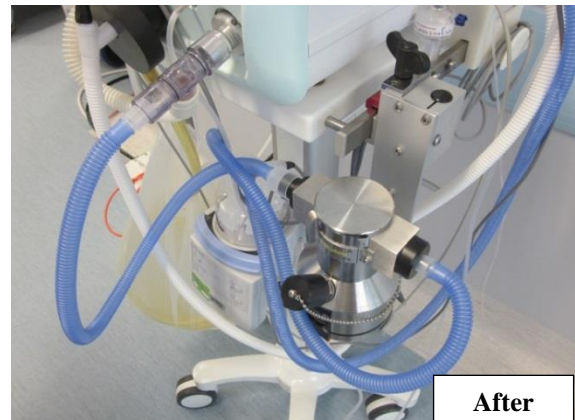


**Step 6:**

- Swap the ventilator and vaporizer tubing connections indicated by the red dots in the picture shown, below on the left. The picture below on the right shows, the reconfigured tubing which places the Diamedica® drawover vaporizer in circuit and ready for use.



Before



After

**Step 7: IMPORTANT**

- Set the desired lower and upper alarm limits for volatile agent delivery the GE Aisys CS2 anaesthetic machine patient monitor.

**Step 8:**

- Set the dial on the Diamedica® Draw-Over Vaporizer as required to start delivery of anaesthetic agent.
- Any changes to vaporizer output are reflected on the GE Aisys CS2 anaesthetic machine patient monitor within 10-15 seconds allowing precise manual control of Sevoflurane agent concentration.

**VERY IMPORTANT SAFETY NOTE:**

HFOV mode must **NEVER** be selected on the Fabian HFO ventilator when the Diamedica® Drawover Vaporizer is in use.

In HFOV mode, the **AGENT CONCENTRATION IS VASTLY INCREASED** beyond the dial setting as the result of pulsatile gas flow in the patient circuit.

**Departure from OT:**

After surgery, an intubated and ventilated neonate requiring transfer to NICU in a GE Giraffe Omnibed or a Fisher Paykel Open Care Unit requires reconfiguration of the ventilator set-up prior to leaving OT.

**Step 1:**

- Swap the ventilator and vaporizer tubing connections indicated by the red dots in the picture shown, below on the left. The picture below on the right shows, the reconfigured tubing which takes the Diamedica® Drawover Vaporizer ***out of circuit*** and seals the connections ready for patient transport.



**Step 2:**

- Leave the black plastic scavenger shroud in place, as shown below on the left.
- Coil and stow the yellow tubing in the plastic bag and hang the bag on the hook indicated below.



**Step 3:**

- Turn on the air and oxygen transport cylinders ready for the return journey to NICU.
- Transfer the black ventilator air supply hose from the wall air outlet to the cylinder supply.
- Transfer the white ventilator oxygen supply hose from the wall oxygen outlet to the cylinder supply.

**Step 4:**

- The cannula used for gas monitoring is to be gently removed from the 'duck-bill' access port at the 'Y' end of the ventilator tubing, as shown below.

