James Paget University Hospitals NHS Foundation Trust | Norfolk and Norwich University Hospitals NHS Foundation Trust

Joint Trust Guideline for the Management of:

Children Requiring Level 2 and Level 3 Care

A clinical guideline recommended

For use in:	Paediatrics
By:	Medical and Nursing staff working in Paediatrics, A+E and ITU
For:	Critically ill children aged from post natal discharge to their 16th birthday
Division responsible for document:	Division 3
Key words:	Critically ill, high dependency unit (HDU), high observation bed (HOB), paediatric intensive care (PICU), high dependency
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Quick reference guidelines

Abbreviations

CAU	Children's Assessment Unit
CCC	Critical Care Complex
CPAP	Continuous positive airways pressure
FiO2	Inspired oxygen concentration
HOB	High observation bed
HDU	High dependency bed (Level 2 care - Intermediate Critical Care)
ITU	Intensive Care Unit
NICU	Neonatal Intensive Care Unit (Level 2 or 3 care)
PAU	Paediatric Assessment Unit
PICU	Paediatric Intensive Care (Level 3 care - Advanced Critical Care)

Objectives

To provide written guidance on the type of clinical cases for whom Level 2 and 3 nursing care should be provided. This will allow optimal bed usage and reduction in potential risk management issues arising from the management of children with these conditions in non-HDU beds. The guidelines will be used to set audit criteria to ensure that the nationally recognised standards of care are delivered.

The guidelines will comply with the policy: High Dependency Unit Operational Policy.

Rationale

There are 2 designated HDU beds on Buxton ward (Room 2). There is an option to increase this number using either the other 2 bedded cubicle (Room 13) or a side room close to the nurses station if clinically indicated as and when dependency dictates. Minimum safe staffing levels dictates staffing 2 high dependency beds with the recommended nursing levels of 1 HDU trained nurse for every 2 HDU patients.

Clear guidelines are available from the Paediatric Intensive Care Society and from the report of an Expert Advisory Group to the Department of Health providing national standards for children requiring HDU care within a district hospital setting. This includes specific clinical conditions which should be nursed in Level 2 and 3 environments. The evidence base for the recommendations is patchy but they represent consensus management from two groups of acknowledged experts in UK PICU/HDU practice.

The aim of these guidelines is to ensure that the level 2 and level 3 care that already takes place at the Norfolk and Norwich University Hospital reaches these standards in terms of nursing, medical and equipment provision.

Due to peaks in demand for HDU beds their appropriate usage is essential to reduce risk management issues.

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Broad recommendations

All aspects of childrens care within this guideline will be in compliance with the Norfolk and Norwich HDU operational policy document.
All children meeting the criteria for HDU nursing should be accommodated in HDU beds on Buxton, NICU or CCC.

If an HDU bed is likely to be required after an elective surgical procedure the clinicians involved must ensure a bed is available before commencing the procedure. These beds can be booked through the nurse in charge on Buxton ward or CCC as appropriate.

Specific recommendations

- All patients occupying HDU beds will be highlighted on PAS using recommended I.T. guidelines.
- These beds are staffed to the agreed level (Paediatric Intensive Care Society Guidelines) with respect to the numbers and skill level of the nursing staff.
- The list below include clinical conditions for which children up to the age of 16 will require nursing in a level 2 (high dependency) or level 3 (intensive care) bed.
- A Consultant Paediatrician will be the lead consultant on Buxton ward and a Consultant Intensivist on CCC. The overall responsibility for children occupying an HDU bed on Buxton ward lies with the Paediatric Consultant on call.
- All children occupying an HDU bed will be reviewed by a senior clinician (Registrar or Consultant) within 4 hours of admission to HDU irrespective of speciality under which child was admitted.
- All children occupying an HDU bed will be discussed with the Paediatric Consultant on call within 4 hours of admission irrespective of speciality under which child was admitted.
- All children occupying an HDU bed will be reviewed by the Paediatric Consultant on call within 14hours of being admitted irrespective of speciality under which child was admitted.
- All HDU patients will be reviewed by the paediatric medical team at a minimum of at least three times daily (approximately 8 hourly). The Paediatric Consultant on call must review the patient on at least two consultant led handovers every 24 hours. This is usually in the morning and the early evening handover ward round. The Paediatric Registrar on call at night will review at around midnight.
- More frequent reviews may be required depending on the child's condition. The minimum training grade of doctor to review a patient in HDU is the Paediatric Registrar.
- The decision to downgrade a child from a HDU bed to a general bed will be made by the multidisciplinary team (which includes senior nurses) either at the morning or evening ward round, but can be made at any time of the day.

- Potential CCC admissions including all possible PICU transfers should be discussed with the CCC middle grade on call who will facilitate Consultant Anaesthetist and/or Intensivist support as indicated. The electronic referral form must also be completed to support an audit trail of referrals.
- There is experienced paediatric middle grade cover on site for Buxton ward and experienced middle grade cover on site for CCC. All paediatric middle grade and consultants should be up to date with PALS or APLS /EPLS training.
- Nurses working in HDU should have a minimum of 3 years post qualification nursing experience unless under direct supervision from a suitably trained nurse with HDU training.
- Ideally all nurses working in HDU should have undertaken additional HDU training at post graduate level and hold all relevant competency certificates (in keeping with Appendix 4 of PICCS standards 2010).
- There should be at least 1 senior nurse on shift in Buxton ward who has undertaken APLS/EPLS training.
- All HDU patients should have their morning ward round documented on the blue HDU sheets that are present on the ward. Remaining daytime and evening reviews can be completed on either the blue sheet or the patients ordinary notes, but must be documented.

For the majority of children the level 2 care will be provided in the 2 HDU beds on Buxton ward.

- In certain circumstances (e.g. very young age, very small size, recently discharged from neonatal unit, the Paediatric Consultant and NICU Consultant on-call may decide that the use of an isolation cubicle on NICU is more appropriate. (See Appendix 1).
- These guidelines do not apply to infants who have not been discharged from the hospital after birth as they will be cared for on NICU.
- The use of an adult CCC bed may be more appropriate in certain clinical situations e.g. after trauma, postoperative care. This should only be after discussion with the CCC Consultant, on call Paediatric Consultant, any other consultants involved and the senior paediatric nurse.
- In certain circumstances (section B) the child's case should be discussed with PICU.
- Elective surgical procedures that may require postoperative HDU care should only be undertaken if the HDU bed is available either on Buxton ward or CCC.

A. All critically ill children should be nursed in a high dependency bed on Buxton (or the NICU or CCC if there is multidisciplinary agreement and it is clinically more appropriate. This includes the following conditions:

- Status epilepticus or recurrent seizures.
- Glasgow coma scale 8-12.

- Bacterial meningitis.
- Meningococcal septicaemia without cardiovascular instability.
- Circulatory instability due to hypovolaemia other than meningococcal disease (failure to respond to treatment necessitates level 3 care).
- Shock which required resuscitation with 20-40 mLs/kg sodium chloride 0.9% solution.
- Diabetic ketoacidosis requiring a continuous infusion of insulin.
- Pain requiring complex regimes or any child with uncontrolled pain.
- Continuous IV drug infusion (except analgesia alone).
- Acute renal failure or oliguria (<1mL/kg/hour).
- Asthma requiring hourly nebulisers/inhalers or IV treatment.
- Nebulized adrenaline for upper airways obstruction (after 2 doses consider transfer to PICU or CCC).
- Poisoning/substance use when specifically advised by Poisons Unit.
- During/after sedation for procedures in acutely unwell children (elective procedures undertaken on the Children's Day Ward require1:2 level of nursing care).
- Pre or post-operative patients with complex fluid management, active bleeding, undergoing complex surgery including thoracic/spinal surgery or with complex medical needs.
- Cardiac arrhythmia which has responded to first line treatment (except cardioversion).
- Significant abdominal trauma with risk of delayed haemorrhage.
- Patients with a newly formed tracheostomy or for whom excess secretions are compromising their airway.
- Patients who have newly inserted nasopharyngeal airways.
- Patients who are receiving TPN prescribed by the hospital and where parents are not responsible for its administration.
- Oncology patients receiving multiple intravenous antibiotics.
- CPAP for bronchiolitis (Non-invasive ventilatory support including CPAP
    - via mask, prong or short tube).
- Recurrent apnoeas (NICU or CCC if clinically more appropriate).
- Child with moderate upper airways obstruction (see stridor guidelines).
- Significant risk of obstruction post operatively (NICU or CCC if clinically more appropriate).
- FiO2 > 50% via head box or facemask.
- Epidural or nurse controlled analgesia in children under 1 year.

B. Transfer of patient to a bed on Critical Care Complex and/ or transfer to PICU

- All paediatric admissions to the Critical Care Complex will be made through the Consultant Intensivist on call via the CCC middle grade on call. The senior paediatric nurse (bleep 0068) should be informed of the admission by the admitting CCC nurse and the paediatric middle grade on call (bleep 0009) by the CCC middle grade. The middle grade paediatrician will inform the consultant paediatrician on call if they are
- not already involved. If the patient is to be admitted post op under a surgical consultant the paediatricians should still be informed as soon as the admission is anticipated.

- The majority of paediatric admissions will be for the purpose of resuscitation and stabilisation prior to transfer to a PICU. Calls for assistance with the care of a critically ill child (e.g. from A&E, Paediatric wards) should be via. the CCC and senior assistance will be given initially by the CCC Consultant or senior resident anaesthetist. A Consultant Paediatric Anaesthetist will also be contacted at this stage.
- Except in exceptional circumstances, the primary Consultant will make a referral to the PICU before the child reaches the CCC. The referring Consultant, Consultant Paediatric Anaesthetist and Consultant Intensivist will share the responsibility for managing the child before transfer.
- Not all children admitted to the CCC will require transfer to a PICU. (Particularly older children who are admitted after major elective or emergency surgery). Decisions on whether children remain on the CCC or are transferred to a PICU should be agreed by all involved consultants, although a child may not stay on CCC without the consent of the Intensivist on call. The decision to refer will be dependent on the child's age, severity of illness and the staffing expertise available at the time.

Guidelines on referral to PICU

The following "procedures" are "critical care dependent" and should be performed in a paediatric critical care environment.

- Endotracheal intubation
- Endotracheal Continuous Positive Airway Pressure (endotracheal CPAP) (acute and medium term)
- Artificial/mechanical ventilation (acute and medium term)
- Continuous invasive cardiovascular monitoring (e.g. central venous or arterial line)
- Use of antiarrhythmic, inotropic or vasoactive drug infusions,
- Acute renal support (haemodialysis, haemofiltration, plasmafiltration and peritoneal dialysis)
- Cardioversion or DC countershock
- Acute or external cardiac pacing
- Mechanical circulatory support
- Intracranial pressure monitoring

- Complex intravenous nutrition and drug scheduling
- Complex/intravenous anticonvulsant therapy
- Frequent or pressurised infusions of blood products
- Active or forced diuresis
- Induced hypothermia
- Balloon tamponade of oesophageal varices
- Emergency thoraco - or pericardiocentesis

Paediatric intensive care admission is mandatory for patients likely to require advanced respiratory support (i.e. acute or medium term mechanical ventilation) but children should also be referred to a PICU:

- If it is highly likely that they will need an intensive care dependent procedure
- Who have symptoms or evidence of shock, respiratory distress or respiratory depression
- Who have the potential to develop airway compromise
- Who have an unexplained deteriorating level of consciousness
- Who have required resuscitation or who are requiring some form of continuing resuscitation
- Who have received a significant injury
- After prolonged surgery or any surgical procedure that is medium or high risk or of a specialist nature, even if this surgery is elective.
- Who have potential or actual severe metabolic derangement, fluid or electrolyte imbalance
- Who have an acute organ (or organ-system) failure
- Who have established chronic disease (or organ-system failure) and who experience a severe acute clinical deterioration or secondary failure in another organ-system.
- Who require one to one nursing because of the severity of an acute or acute on chronic illness

Clinical audit standards

All children meeting the criteria for HDU nursing should be accommodated in HDU beds and receive 1:2 nursing care.

No child requiring PICU support (section C) should remain on Buxton Ward at the Norfolk and Norwich University Hospital. Children in this category should only be accommodated in CCC in the short term and with the approval of the Intensivist on call.

Relevant critical incident triggers include P08 Transfer to PICU, P10 Stay of 7/7 on HDU, P11 Unexpected deterioration in condition, P12 Cardiac arrest and P13 Respiratory arrest.

Retrospective data will be collected to review the total number of high dependency patients the ward is accommodating in relation to the number of designated HDU beds currently open.

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Summary of development and consultation process undertaken before registration and dissemination

- **The PICS Guidelines and Recommendation of the Expert Working Group were discussed in the multi-disciplinary Children's Critical Care Working Group (CCCWG) and agreed.**

The draft of this document has been circulated (by email) for comment to all consultant paediatricians and paediatric surgeons and senior paediatric nurses. It has been discussed in paediatric directorate in a guidelines meeting and in the CCCWG with representatives from the ITU/HDU, A&E, Anaesthetic, Paediatric surgical and medical directorates. These comments were incorporated into the document, which was then circulated to consultants in all surgical specialties who treat children and to the lead consultant and senior nurse for PICU at Addenbrookes Hospital.

The document was reviewed by paediatric consultants and the CCCWG.

This version has been endorsed by the Clinical Guidelines Assessment Panel.

Distribution list / dissemination method

Buxton ward, NICU, CAU, CCC, senior nurses.
Trust intranet.

References/ source documents

1. Standards of care for the care of critically ill children (5TH EDITION), December 2015. Paediatric Intensive Care Society Document.

2. High Dependency care for children – Time to move on 2014 Royal College of Paediatricians and Child Health (RCPCH guidelines.

3. Standards of care for the care of critically ill children (4TH EDITION), June 2010. Paediatric Intensive Care Society Document.

4. The acutely or critically sick or injured child in the district general hospital: A team response. Report of an Expert Advisory Group for the Department of Health Oct 2006

5. NSF for children, young people and maternity services: Standard 6: Children and young people who are ill. Department of Health 2004

6. High Dependency Care for Children – Report of an Expert Advisory Group for the Department of Health 2001

7. Paediatric Intensive Care Society standards document 2001, 2nd Ed pages 19-21

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Appendix 1:

Admission of infants under 5Kg weight requiring intensive care

Infants under 5Kg who are acutely unwell and require intensive care are small in number. They usually require short term support whilst awaiting retrieval to PICU by CATS or another transport service. In the majority of cases it is preferable for the infant to be admitted to Neonatal Intensive Care [NICU] with multidisciplinary collaborative working from Acute Paediatrics, Critical Care Complex [CCC] and Paediatric Anaesthetics. Shared decision making about the placement of patients and the provision of care will need to take into account the following issues:

1. Infection control
2. The availability of suitable equipment
3. Nursing staff numbers and expertise
4. Medical staff numbers and training
5. The needs of other patients in NICU, CCC and Buxton

The key issues to consider are place of admission, clinical lines of responsibility and the provision of nursing care

1. **NICU:**

Infants should usually be admitted to NICU with the agreement of the NICU Consultant and lead nurse if

- Infection control can be safely addressed [this will in most cases require admission to a side room]
- there are adequate qualified nursing staff

a. Acute clinical responsibility will be assumed by the NICU medical/ANNP team, to include:
   - airway and ventilator management
   - prescribing of fluids and medications
   - the requesting of investigations etc

Advice is available from consultant staff on PICU and/or CATS and it is recommended that the management plan be discussed at the earliest opportunity

b. Wider ongoing clinical responsibility will remain with the General Paediatric and/or surgical team, to include:
   - liaison with PICU over transfer [and with any other outside agencies]

- correspondence including entry of patient data onto the Badger database, referral letters and discharge summaries
- management of safeguarding concerns [where required]
- long-term follow-up

At a minimum the General Paediatric/Surgical team will provide:

- Consultant review at least twice in every 24 hours
- middle grade review at least 8 hourly

a) Nursing care will be provided by NICU staff. NB there may be a requirement for nursing teams from General Paediatrics and/or the CCC to provide support including, where appropriate, the temporary transfer of staff between units.

2. **<u>Critical Care Complex [CCC]:</u>**

If the infant cannot be admitted to NICU the second line option is accommodation on CCC.

a) All Paediatric admissions to the Critical Care Complex must be agreed with the Critical Care Consultant on call. Whilst Critical Care runs as a closed unit with final say over medical decision making sitting with the Critical Care Consultant if an infant is admitted it will require a very close degree of co-operation between the Critical Care, General Paediatric and Paediatric Anaesthetic teams. In addition, the Tier 2 NICU team member should also be informed at admission in case later support is required. All patients admitted to Critical Care must have a nominated primary medical or surgical specialty Consultant.

b) It is envisaged that the <u>initiation</u> of intensive care will usually be led by the Paediatric Anaesthetic team [with the support of General Paediatrics] to include:

- Airway management including intubation
- Initiation of ventilator support
- Establishment of arterial and central venous access where required

c) <u>Ongoing</u> care on CCC will be led by the General Paediatric team [with support from CCC medical team and Paediatric anaesthetists and/or NICU where required], to include:

- Prescribing of fluids and medications
- Requesting investigations
- Liaison with PICU and other outside agencies
- Correspondence
- Long-term follow-up

d) Nursing care will be provided by CCC; 2 nurses will be allocated wherever feasible. It is highly desirable that a Paediatric-trained nurse should also contribute to care and there will, therefore, be a requirement for the nursing team from General Paediatrics and/or NICU to provide support including the temporary transfer of staff between units if feasible.

3. **Other options:**

If neither NICU nor CCC can accommodate the patient then care may be continued in CAU, A&E, the Buxton ward HDU facility or a theatre anaesthetic room as available [the best option will be decided by the senior medical and nursing teams present]. Medical and nursing support will be provided by NICU, General Paediatrics and CCC as requested by the Paediatric Anaesthetic Consultant.

Provision of intensive care support in any of these clinical areas should be an interim measure only and, unless it is agreed between all clinical teams involved that very short term support is expected, a referral to PICU for retrieval should be made at the earliest opportunity.

Additional considerations

1. Elective surgical admissions:

- There are a small number of infants <5kg undergoing elective surgical procedures for whom it is anticipated that short term intensive care support may be needed post-operatively. In those circumstances, a member of the clinical surgical team or waiting list coordinator should make a request for potential admission, at the earliest opportunity, by informing the NICU Matron by email of the patient details, including intended date of surgery. Once the baby has been accepted for potential admission, the required cot will be made available unless, on the day of surgery, unit capacity is insufficient
- Infants <5kg undergoing elective surgical procedures who are anticipated to need significant ongoing intensive care support post-operatively should be referred to a surgical centre with PICU facilities for the procedure.

2. High dependency Care:

- The care needs of most infants <5kg requiring High Dependency care can best be met on the Buxton HD facility. Rarely, it may be felt that admission to NICU for HD care is more appropriate, in which case the anaesthetist, surgeon or General Paediatrician involved should discuss the details with the Consultant neonatologist and NICU senior nurse.