

A Framework of Competences for the Level 3 Training Special Study Module in Paediatric High Dependency Care

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Section 1 Introduction

Who is this book for?

It is for doctors at Level 3 in their General Paediatric training who wish to work towards an expertise in Paediatric High Dependency Care during Level 3 training. It is also there to guide tutors and educational supervisors.

Why do I need it?

This book gives you and your tutors' guidance about the competences you need to cover **in addition** to the Framework of Competences for Level 3 Training in General Paediatrics. It gives you a clear picture of what you have to achieve by the end of this module of training in order to have expertise in this area.

How do I use the book?

You can sit down with the book on your own and use it to help you identify areas of practice that you need to work on and those areas in which you feel fairly confident. You can talk to your tutor about the balance of your experiences and look for ways to ensure you cover all areas you need to. It should be used by Schools and Educational Supervisors to ensure that a programme of training is developed in Level 3 which will allow the trainees to achieve these competences. In determining this programme, liaison with the relevant CSAC is important. In the appendix, there is guidance for training in the module which the programme must adhere to.

Progression

Following completion of Level 3 training and the module, the CCT holder should be competent to take up a post as a General Paediatrician or a General Paediatrician with a Special Expertise in this area. It is expected that there will be a requirement in paediatric services for consultants with special expertise provided by the module. Such posts will usually form part of a Regional Specialty Network including working with accredited sub-specialties in this area.

A note about the format of this document

This framework sets out the additional competences which should be achieved by the end of Level 3 training. The trainee also has to achieve all the competences in the Level 3 General Paediatric Framework

Assessment

The RCPCH Assessment Strategy (PMETB approved) for Level 3 Training will be used. Trainees working with their educational supervisors should ensure that the Assessment Strategy is tailored to cover the area of Special Expertise as well as General Paediatrics and that learning and assessment are well documented within the e-portfolio.

Pilot

This special expertise module is being introduced as a pilot. The College will be seeking feedback from the Trainees, Educational Supervisors, Schools of Paediatrics, CSACs and potentially in future from Employer NHS Trusts and Regional Networks. This will look at:

1. Need for training in this module
2. Addition or omission of competences unique to the module
3. Feasibility of delivering the module within Level 3 General Paediatric training
4. Usefulness of the standards for training for the module.
5. Outcome of trainees undertaking the module
6. Need for revision of the competences
7. Need for further assessment

Background to this module

- The 2001 Department of Health report on 'High Dependency Care for Children' specified that all in patient paediatric units should be able to provide HDU level care
- Large amounts of HDU level care are currently delivered in DGH ward areas, and in tertiary centres outside of PICUs
- Increasing numbers of designated paediatric HDUs are being established
- HDU level care is equivalent to level 1 PICU care (PICS Standards 2001)
- 'High level' HDUs are undertaking non-invasive ventilation, arterial and central venous pressure monitoring, and delivering continuous infusions of inotropes, prostaglandin, anti-hypertensive agents (labetalol etc) and bronchodilator therapy (aminophylline, salbutamol).
- To ensure the highest quality of care, and optimal outcomes, children requiring HDU level care should be looked after by doctors and nurses who have had specific training in care of the critically ill child
- A formal competency based training structure exists for nurses working in HDU areas
- However until now no recommendations or training structure has existed for paediatric medical staff wishing to look after critically ill children who require HDU level care.

These recommendations are intended for paediatricians leading on the delivery of High Dependency Care **or** providing care within a 'high level' HDU **or** undertaking HDU clinical duties as a significant proportion of their clinical time.

It is recognised that any paediatrician working in a hospital with designated HDU beds may be required to look after a child requiring HDU level care in the context of their on-call duties. It is acknowledged that, whilst desirable, it

may not be feasible for all general paediatricians to be trained to the level of competencies recommended in this document.

Training recommendations

The knowledge and understanding, and skills required are outlined below in the Competency Framework.

It is recognised that the time taken to achieve these competencies will vary depending on the abilities of the individual doctor, and the amount of clinical experience and training that can be provided in any unit. However it is estimated that in most cases a minimum period of 12 months spent working in a PICU will be required, along with a minimum period of 12 months working within the paediatric department of a tertiary centre or large DGH with designated paediatric HDU beds.

To achieve the specific airway, sedation and anaesthesia, and pain management knowledge and skills it is recommended that a minimum of 1 month of the PICU period be spent in the operating theatre, working alongside a consultant anaesthetist.

Characteristics of the paediatric department training post

- 3 or more designated HDU beds.
- Minimum HDU throughput of 150 infants and children per year.

Characteristics of PICU training post

- Minimum of 6 PICU beds
- Minimum patient throughput of 400 admissions of whom at least 200 require mechanical ventilation (invasive or non-invasive).
- Access to consultant anaesthetists, operating theatres and pain management team, in order to achieve airway, sedation and anaesthesia, and pain management skills.

Section 2 Specific Competences in Paediatric High Dependency Care

Knowledge and Understanding

- know the natural history of the major causes of critical illness in childhood and prognostic indicators
- understand the structure of paediatric critical care service in the UK, the rationale for centralisation and consequent evolution of retrieval services and managed clinical networks
- recognise the fluctuant nature of the demand for HDU admission and how units plan for this
- know about severity of illness scores, how they are developed and used
- know the complications of critical illness and methods used to minimise these

Skills

- be able to offer clear, prioritised and realistic advice on the management of the critically ill child
- recognise the need to accelerate the level of support of the critically ill child and institute the necessary interventions

Values and Attitudes

- be able to function with both confidence and diplomacy outside the comfort of the HDU environment, for example in A and E or non-critical care wards
- recognise the impact of separation between child and parents during critical illness
- be aware of the stresses placed on patient and family by admission to HDU

Teaching and Research

- understand the need for accurate data collection to allow continuous audit and quality control in HDU

- appreciate the need to carry out research in the sickest patients to facilitate improvement in care, but also the problems involved in performing these studies, for example obtaining informed consent in the emergency situation

Leadership and Management

- recognise when the limits of improvement have been reached with medical management and the patient requires urgent intervention, perhaps elsewhere
- be able to plan safe and timely discharge from HDU

Communication Skills in Paediatrics

- ensure detailed discharge plans are explained to referring clinicians including outstanding issues that have not been addressed on the HDU

Section 3 Specific Clinical Competences in Paediatric High Dependency Care

Growth and Nutrition

- understand the importance of adequate nutrition and how nutritional needs may be altered in critical illness
- understand the principles behind prescribing and monitoring of parenteral nutrition
- understand that specific nutritional deficits can complicate critical illness
- understand how obesity may complicate the management of critical illness and take account of this when planning care

Section 4 Condition-specific Competences in Paediatric High Dependency Care

Sedation & Anaesthesia, Pain Management, Airway Management and Resuscitation

- understand the benefits and potential risks of controlled ventilation in the serious ill or injured child
- have a working knowledge of the pharmacology of commonly used anaesthetic agents, sedatives and analgesics the indications for their use and their side effect profiles
- understand the principles of inhalational anaesthesia
- know about the Association of Anaesthetists of Great Britain and Ireland minimum standards of monitoring
- understand the principles behind key monitoring modalities, such as pulse oximetry, end-tidal CO₂ monitoring and invasive pressure monitoring.
- know the principles of regional anaesthesia
- be able to manage a child with an epidural in place
- recognise the child who requires airway intervention and ventilation
- be able to manage the airway to the point of intubation, using appropriate equipment
- be able to safely employ sedation for procedures where the child is stable and cooperative enough to facilitate this
- work within the bounds of their experience and training and recognise when expert assistance is required

| The conduct of anaesthesia for intubation of a child | Knowledge and understanding | Skills |
|---|--|--|
| Stable patient requiring non emergency invasive procedure, for example vascath for semi-urgent CVVH | <p>understand the need for an empty stomach</p> <p>know the patient factors which increase risk of anaesthesia</p> | <p>be able to explain a procedure and discuss general anaesthesia</p> <p>be able to supervise post-anaesthetic monitoring and assess fitness for discharge to ward</p> <p>be able to prescribe post-</p> |

| | | |
|--|---|---|
| | | procedure analgesia and monitoring on ward |
| Patient requiring emergency procedure | <p>understand the principles involved in anaesthetising the high-risk patient</p> <p>understand the principles of a rapid sequence induction</p> | <p>be able to plan post-procedure care according to procedure and patient factors</p> <p>be able to prescribe post-procedure analgesia and monitoring on ward</p> |
| In shock | <p>understand the outcome benefits of early organ support in the child with septic shock</p> <p>understand the cardiovascular effects of anaesthetic agents</p> | recognise the child with cardiovascular compromise |
| With cardiac pathology | <p>understand the benefits of assisted ventilation in myocardial dysfunction</p> <p>understand the specific anaesthetic risks for specific cardiac pathology</p> | be able to identify situations where expert help is needed |
| With serious head injury | <p>understand need for low threshold for intubation in child with serious head injury requiring transport</p> <p>understand factors which increase risk of secondary injury</p> <p>know which anaesthetic agents increase intracranial pressure (ICP)</p> | be able to monitor child for clinical signs of seizures, rising ICP and/or under-sedation |
| With respiratory failure | <p>understand particular difficulties which may occur in severe acute asthma</p> <p>know which agents may be useful in alleviating bronchospasm</p> | <p>be able to anticipate cardiovascular compromise</p> <p>recognise the need to avoid drugs which precipitate bronchospasm</p> |
| With upper airway obstruction including tracheal compression | <p>understand the use of inhalational anaesthesia in this setting</p> <p>understand the need for caution with muscle relaxants</p> <p>understand the potential for deterioration on induction</p> | <p>be able to assess a patient for airway obstruction and determine the level</p> <p>know when to call expert help</p> <p>recognise when airway is inadequate for transfer</p> |
| The difficult airway | <p>be familiar with assessment of the airway</p> <p>understand the issues surrounding ventilation via needle cricothyroidotomy</p> | <p>be able to assess a patient for ease of mask ventilation, laryngoscopy and tracheal intubation</p> <p>have a structured approach to airway management</p> <p>know when to call expert help</p> |

| | | |
|---------------|--|--|
| | | be able to perform needle cricothyroidotomy |
| Resuscitation | <p>know the algorithms for management of cardiac arrest</p> <p>understand and be able to identify the reversible causes of cardiac arrest</p> <p>understand the problems surrounding the patient post-successful resuscitation</p> | <p>be able to lead a team in CPR</p> <p>be able to treat reversible causes of cardiac arrest</p> <p>be able to make an informed decision to stop resuscitation</p> <p>be able to manage a patient following successful resuscitation</p> |

Cardiology

| The patient presents with: | Knowledge and understanding | Skills |
|--|--|--|
| Cyanosis | | be able to initiate inotropic support in a sick neonate with possible CHD |
| Heart Failure, including cardiac conditions which present with shock | understand the potentially deleterious effects of anaesthetic and sedatives agents in this setting | be able to use inotropes and vasodilators appropriately to support the failing heart |

Diabetes and Endocrinology

- understand the impact of critical illness on normal endocrine function and the potential for clinically important effects
- be able to manage children with known endocrine abnormalities admitted to the HDU with an acute exacerbation or for another condition or surgery

| The patient presents with: | Knowledge and understanding | Skills |
|-----------------------------------|--|---|
| Hyperglycaemia | <p>Understand the pathophysiology of the stress response in a critically ill child</p> <p>Have knowledge of the literature relating to hyperglycaemia and outcome in critically ill patients</p> | be able to treat hyperglycaemia safely and effectively with intravenous insulin where appropriate |

Gastroenterology and Hepatology

- understand the effect of cardiovascular dysfunction on hepatic function
- understand the systemic effects of liver failure
- understand the pharmacokinetic and pharmacodynamic changes which occur in liver failure

| The patient presents with: | Knowledge and understanding | Skills |
|-----------------------------------|---|---|
| | know the principles of use of the Sengstaken tube | be able to initiate therapies to reduce bleeding and to empty the gut |
| Acute liver failure | <p>understand markers of severe liver dysfunction and their prognostic value with respect to: indications for liver transplantation</p> <p>understand the principles of liver transplantation and factors which affect outcome</p> <p>know the clinical grading of encephalopathy in liver disease</p> <p>understand that early intervention, including intubation and ventilation is important</p> | |

Haematology and Oncology

- know the reasons why patients diagnosed with oncology and haematology conditions present to the HDU
- be aware of the literature describing the changing prognosis for this cohort of patients in the PICU
- recognise the special requirements of the oncology patient cared on the HDU and liaise effectively with the oncologist involved
- recognise the child at risk from tumour lysis syndrome (TLS)
- know the methods used to minimise the risk of TLS and how to identify it
- be able to institute therapy urgently for TLS including renal support
- understand the risk to the airway presented by a mediastinal mass
- liaise with oncologists and anaesthetists to ensure any intervention is performed in the most appropriate setting

| The patient presents with: | Knowledge and understanding | Skills |
|-----------------------------------|---|---|
| Anaemia | <p>know the limited indications for exchange transfusion</p> <p>know the pathophysiology and therapy of sickle chest syndrome and plastic bronchitis</p> | <p>be able to perform an exchange transfusion when indicated</p> <p>be able to recognise the need for bronchoscopy in sickle chest crisis</p> |
| Neutropaenia | understand the most likely source and pathogens in oncological sepsis | be able to elicit signs of severe neutropaenic sepsis and give appropriate advice |
| Leukaemia | understand that an extremely high white cell count increases the risk of tumour lysis syndrome | |
| Thrombosis | <p>understand the risk factors for arterial and venous thrombosis particularly when associated with intravascular access</p> <p>know the indications, contraindications and complications of thrombolysis</p> <p>know the long term sequelae of thrombosis</p> <p>know about heparin induced thrombocytopenia (HIT) and related intravascular coagulation</p> | <p>take steps to minimise the risks of developing thrombosis on the HDU</p> <p>be able to initiate investigations for procoagulability and liaise with haematologists regarding more specific investigations</p> <p>be able to diagnose and treat venous and arterial thrombosis</p> <p>be able to screen for HIT and take necessary action</p> |

Infection, Immunology and Allergy

| The patient presents with | Knowledge and understanding | Skills |
|----------------------------------|--|---|
| Septic shock | <p>understand how changes in cardiac output and systemic vascular resistance vary in paediatric septic shock and methods used to assess these parameters</p> <p>understand how vasoactive drugs may affect these parameters</p> <p>understand the systemic effects of hyperthermia and rhabdomyolysis</p> <p>know the causes, clinical presentation and specific therapies for Toxic Shock Syndrome</p> <p>know the causes, associations and distinguishing features of necrotising fasciitis</p> <p>understand the need for urgent surgical debridement in necrotising fasciitis</p> <p>know about immune-modulatory therapies</p> <p>know about the use of haemofiltration in septic shock</p> <p>know about the Surviving Sepsis Campaign and associated care bundles</p> | be able to recognise Toxic Shock Syndrome and / or necrotising fasciitis and instigate specific therapies |

Metabolic Medicine

- have an advanced knowledge of acid base physiology and be able to interpret results in the clinical context
- be able to manage the child with a known metabolic condition admitted with an acute exacerbation of their condition to the HDU, including indications for haemofiltration

Multi-organ failure and support

- know how organ systems interact in health and serious illness

- know the available scoring systems that are available to estimate severity of illness in critically ill children
- be able to collect appropriate data accurately to record the level of organ dysfunction and predict the risk of mortality

| System involved | Knowledge and understanding | Skills |
|------------------------|---|--|
| Respiratory | <p>know the indications and benefits of different forms of ventilation including non-invasive methods</p> <p>know the causes of failure to wean ventilation</p> <p>know the principles of respiratory function tests</p> | <p>be able to initiate and manipulate ventilation according to patient's pathophysiology</p> <p>be able to manage pneumothoraces, chest drains</p> <p>be able to construct a weaning plan</p> <p>be able to manage a patient with a tracheostomy including tube change</p> |
| Cardiovascular | <p>know the parameters which affect oxygen delivery</p> <p>know how these parameters such as cardiac output can be measured</p> <p>understand cardiopulmonary interactions</p> <p>know how vasoactive drugs and fluid affect the circulation</p> <p>know the principles of mechanical support</p> | <p>be able to determine cardiovascular status at the bedside</p> <p>be able to manage a child with arterial and central venous cannulation for the purpose of monitoring</p> <p>be able to manipulate parameters which affect oxygen delivery and assess the response to therapy</p> |
| Haematology | <p>know the risk factors for thrombus formation and diagnostic and therapeutic options</p> <p>understand the involvement of the coagulation cascade in the pathogenesis of systemic inflammatory response</p> | <p>be able to assess need for thromboembolic prophylaxis</p> |
| Renal | <p>understand the benefits and risks of renal support in multi-organ failure</p> <p>know about hepatorenal syndrome</p> <p>know how renal impairment affects pharmacokinetics</p> | <p>be able to prescribe medication appropriately to achieve maximal effect with minimal toxicity</p> <p>know when renal support is indicated</p> |

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| | know the non-renal indications for haemofiltration | |
| Neurology | know the causes of peripheral weakness after critical illness including critical care polyneuropathy and its associations know the principles of management of raised ICP | be able to recognise and investigate the cause of peripheral weakness be able to monitor the patient for level of analgesia and sedation |
| Nutrition and fluids | understand the fluid requirement of the critically ill child, how this may differ from healthy children and methods used to monitor requirements know how energy expenditure may be measured understand the value of enteral feeding and know the complications of TPN understand the importance of glycaemic control | be able to prescribe fluid and nutritional therapy for the critically ill child appropriately |
| Musculoskeletal | understand the factors that lead to pressure wounds and methods used to reduce their occurrence | recognise and treat pressure wounds |

Neonatology

- know the principles of management of the major neonatal conditions requiring surgical intervention
- be able to liaise effectively with the surgical team

Nephro-urology

- understand the principles in management of the post-renal transplant patient and liaise effectively with the renal team

| The patient presents with | Knowledge and understanding | Skills |
|----------------------------------|---|---|
| Acute renal failure | know methods of preventing renal failure understand the principles of various forms of renal support and when they may be employed | be able to manage the underlying cause of hyperkalaemia be able to prescribe acute renal replacement therapy and monitor its effectiveness |

| | | |
|--------------|--|--|
| | | be able to prescribe peritoneal dialysis |
| Hypertension | | be able to initiate and monitor the use of intravenous antihypertensive agents |

Neurology and Neurodisability

- know what constitutes a neurosurgical emergency and understand the consequences of delay in transfer to an appropriate centre

| The patient presents with | Knowledge and understanding | Skills |
|--|---|--|
| Seizures | know about the ICU management options for status epilepticus, including thiopentone and midazolam infusions | |
| Acute focal neurological signs | know the diagnostic features and principles of treatment of acute demyelinating encephalomyelitis (ADEM) | be able to manage a child requiring urgent imaging |
| Hypotonia, neuropathies and myopathies | understand the principles and indications for non-invasive respiratory support in chronic weakness | be able to assess for respiratory fatigue and instigate support appropriately |
| Meningism and altered consciousness | know the principle of maintaining adequate cerebral perfusion and the methods used to achieve this | be able to advise regarding the need for intubation and ventilation particularly where the child is to be imaged |
| Trauma to central and peripheral nervous systems | understand the vulnerability of the critically ill child to peripheral nerve damage | |

Palliative Care

- understand how high dependency care plays a role in supporting the child, the family and referring clinicians
- understand how high dependency care clinicians can facilitate discussions regarding the appropriateness of future intensive intervention

Respiratory Medicine, with Ear, Nose and Throat

- have a knowledge of the clinically relevant anatomy of the paediatric airway (upper and lower), how it changes with age and the more common congenital abnormalities

- have a knowledge of respiratory physiology and pulmonary mechanics and how these alter with disease and mechanical ventilation
- know the determinants of normal gas exchange, how disease may effect these, which therapies may work to improve these and how they work
- know the parameters that are calculated and used to assess severity of respiratory illness
- know the importance and mechanism of cardiopulmonary interactions in the self ventilating and ventilated child with respiratory disease
- be able to assess a child to determine the need for respiratory support
- be able to institute non-invasive respiratory support and invasive respiratory support via a tracheostomy
- be able to tailor ventilatory strategy according to pathophysiology of the underlying respiratory condition
- be able to assess severity of illness and monitor a patient ventilated for severe respiratory disease
- know of emergency interventions for respiratory crises and indications for their use
- understand the use of bronchoscopy in the diagnosis and management of respiratory failure
- know the prognoses of respiratory conditions admitted to HDU
- be aware of the current options for and issues surrounding long term respiratory support

| The patient presents with | Knowledge and understanding | Skills |
|--------------------------------------|---|--|
| Snoring and obstructive sleep apnoea | | manage the airway appropriately instigate investigations for pulmonary hypertension |
| Acute stridor | know the indications for airway intervention and anaesthetic considerations including gas induction | manage the child with post-extubation stridor |
| Acute severe asthma | know the abnormalities of lung mechanics and resulting abnormal gas exchange pattern know the goals of therapy including ventilation | institute swift weaning of medical therapy as child improves |

| | | |
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| | <p>know the mechanism of action of adjuvant therapies indications for use and important side- effects and/or complications that may result</p> <p>know the principles of safe anaesthesia in this situation</p> <p>understand the risks of repeated HDU / PICU admission and the need for follow up by a respiratory specialist</p> | |
| Lower respiratory tract infection, including pneumonia' bronchiolitis and pertussis | understand pathophysiology, respiratory mechanics and gas exchange abnormalities in these conditions | <p>be able to assess the need for respiratory support</p> <p>be able to institute non-invasive respiratory support and monitor the response to treatment</p> |
| Respiratory failure and Respiratory Distress Syndrome [ARDS] | <p>have knowledge of relevant normal respiratory physiology, including VQ matching, shunt, deadspace ventilation, respiratory system compliance, resistance and time constants.</p> <p>know the defining characteristics, pathophysiology and causes of ARDS</p> <p>know the principles and debates surrounding ventilatory strategies</p> <p>know the mechanism of action and effectiveness of adjuvant therapies</p> <p>know the acute complications of ARDS</p> <p>know the long term effects on lung function</p> | <p>be able to institute non-invasive respiratory support and monitor the response to treatment</p> <p>recognise the associated multi-organ dysfunction and support as appropriately</p> |

Transport and Retrieval of the critically ill child

- understand why a child might require inter-hospital transfer
- be able to organise the logistics of a retrieval
- be able to communicate effectively with referring clinician and receiving HDU
- recognise and minimise the potential risks involved in transfer both to the patient and the team
- understand the need to retain an open mind regarding diagnosis

- understand the need for clear documentation
- understand the medico-legal implications of retrieval
- understand the need for stabilisation prior to transfer but be able to recognise the child in extremis who requires specialist life saving intervention and urgent transfer
- understand the stressful nature of transfer on both the awake child and the family
- take steps to reduce parental anxiety through clear communication, calm demeanor and minimising their time spent separated from the child

| Retrieval of the child with: | Knowledge and understanding | Skills |
|-------------------------------------|--|--|
| Multi-trauma including head injury | <p>understand need to identify all sources of cardiorespiratory compromise prior to transfer</p> <p>understand that cardiovascular instability may be the direct result of a severe head injury but that other causes should first be excluded</p> <p>understand which head injuries are time critical</p> | <p>ensure all major injuries temporised prior to transfer</p> <p>ensure cervical spine immobilisation in any child at risk of cervical spine trauma</p> <p>recognise the child with the time critical head injury</p> |
| Shock | <p>understand the need for early intervention in the shocked child to improve outcome</p> <p>understand the importance of aggressive fluid resuscitation in a child with shock</p> <p>understand the effect of positive pressure ventilation in a child with shock</p> | <p>be able to elicit signs of shock and give appropriate advice</p> <p>be able to consider the most likely pathogen in septic shock and treat accordingly</p> <p>be able to recognise toxic shock syndrome and necrotising fasciitis</p> |
| Upper airway obstruction | <p>understand the risks of transferring a child with inadequate airway (intubated or not)</p> <p>understand the principles of the use of heliox</p> <p>know the indications for intubation and the special precautions required</p> | <p>be able to elicit the most likely diagnosis</p> <p>be able to seek specialist help where necessary</p> |

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| Non-traumatic brain injury and raised intracranial pressure | <p>understand that acute hydrocephalus requires urgent neurosurgical intervention</p> <p>know the signs of raised intracranial pressure</p> | <p>be able to elicit an accurate assessment of level of consciousness and other signs of raised ICP</p> <p>recognise signs of raised intracranial pressure and institute strategy to control this</p> <p>recognise time-critical lesion and assist in logistics of urgent transfer</p> |
|---|---|--|

Trauma and Poisoning

- know the natural history of specific injuries
- know the value of investigations performed, their indications and how they should be interpreted
- liaise effectively with other specialities involved
- arrange for the transfer of the injured child to the appropriate centre

| The patient presents with: | Knowledge and Understanding | Skills |
|-----------------------------------|---|--|
| Multi trauma | <p>know the symptoms and signs of spinal injury and investigations</p> <p>understand the pathophysiology of hanging injury and resulting cerebral injury</p> | be able to transport the patient safely for imaging |
| Burns | <p>understand the complications of burns to special areas including airway burns</p> <p>understand the systemic effects of severe burns</p> | <p>be able to assess airway involvement and seek expert help if required</p> <p>be able to manage carbon monoxide poisoning</p> |
| Drowning | <p>understand the pathophysiology of near-drowning and resulting cerebral and lung injury</p> <p>know the likely causes of secondary pneumonia</p> | <p>be able to manage the patient with lung injury and provide neuroprotection</p> <p>be able to identify and treat secondary infection</p> |
| Head injury | <p>know the mechanisms of primary injury and secondary injury</p> <p>know the effects of injury on cerebral blood flow</p> <p>know the effects of hyperventilation on</p> | <p>be able to instigate neuroprotective measures</p> <p>be able to recognise and treat signs of raised ICP and interpret ICP monitoring</p> <p>be able to interpret a Brain C.T.</p> |

| | | |
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| | <p>cerebral blood flow</p> <p>know the indications for intubation</p> <p>know about ICP monitoring : devices and the value of their use</p> <p>know about existing guidelines for the management of raised ICP</p> <p>know about first and second tier therapies for raised ICP</p> <p>know the prognostic indicators and outcomes</p> | <p>Scan</p> <p>know when to call for expert help</p> |
|--|--|--|

Section 5

Practical Procedures and Investigations

Therapeutic Procedures

- insertion of a laryngeal mask airway (LMA)
- tracheostomy tube change
- arterial line insertion
- peripheral long line insertion
- Naso-jejunal (NJ) tube insertion
- insertion of a peritoneal drain
- insertion of a chest drain
- emergency pericardiocentesis

Pharmacology and Therapeutics

- understand the pharmacology of drugs used in critical care
- understand how severe illness effects the distribution and handling of drugs and alter prescriptions accordingly
- know the pharmacokinetics and pharmacodynamics of drugs used on the HDU
- understand how individuals vary in their ability to metabolise drugs
- understand the risks of dependence and physical withdrawal symptoms from certain sedative and analgesic drugs
- be able to construct safe weaning plans for drugs used on the HDU where indicated

Appendix 1

Paediatric Guidance Checklist

These standards were derived to assist in the assessment of the paediatric training standards in your deanery

Specialty: Special Study Module in High Dependency Care

The Programme (which will consist of a period of training in a PICU and a period of training in a DGH or tertiary centre HDU) should provide:

| 1. Supervision | ✓/x |
|--|------------|
| For both PICU and DGH or tertiary centre HDU components | |
| 1.1 An educational supervisor who is trained in assessment and appraisal | |
| 1.2 An educational supervisor who provides average 1PA per 4 trainees per week of educational supervision | |
| 1.3 Evidence that the assessment strategy is being delivered | |
| 1.4 Trainers receive appropriate training on the delivery of the assessment strategy | |
| For PICU component | |
| 1.5 All consultants providing PICU cover are appropriately trained in PICM (refer to ICTPICM guidance) | |
| 1.6 A Consultant is present on the unit during normal working hours throughout the week with no other commitments. The on-call consultant provides cover solely to PICU | |
| For HDU component | |
| 1.7 A consultant is available to provide supervision on the HDU | |
| 2. Other Personnel | |
| For both PICU and DGH or tertiary centre HDU components | |
| 2.1 Nursing staff with appropriate training in caring for a child in PICU or HDU | |
| 2.2 More than one ST4 -8 in the children's department | |
| 2.3 a consultant is available to the unit during normal working hours throughout the week with no other commitments. | |
| 2.4 pharmacist, physiotherapist, dietician, psychologist | |
| 3. Service requirements and facilities | |
| For DGH or tertiary centre HDU component | |
| 3.1 Specialty specific requirements of subspecialty department: 3 or more designated HDU beds Minimum HDU throughput of 150 infants and children per year | |
| For PICU component | |
| 3.1 Specialty specific requirements of subspecialty department: Minimum of 6 PICU beds Minimum patient throughput of 400 admissions of whom at least 200 require mechanical ventilation (invasive or non-invasive) Designated retrieval service operating 24 hours a day with consultant | |

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| availability to provide advice and support | |
| For both PICU and DGH or tertiary centre HDU components | |
| 3.2 Specialty specific requirements of related clinical departments that are involved in delivery of the curriculum: Input from paediatric pharmacist, paediatric physiotherapist, paediatric dietician, psychologist, pain management teams Access to Consultant Anaesthetists and operating theatres | |
| 3.3 Specialty specific requirements of service departments relevant to delivery of curriculum (e.g. investigation departments, PAMs departments, surgery or anaesthesia): Onsite access to radiology with onsite radiographer 24 hours a day, pathology, haematology and blood bank | |
| 3.4 Specialty specific requirements of clinical networks: The unit participates in an established clinical network | |

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| 4. Educational activities and training | |
| For both PICU and DGH or tertiary centre HDU components | |
| 4.1 It is desirable that 1 month be spent in the operating theatre working alongside a consultant anaesthetist to achieve anaesthesia, sedation and pain management to achieve skills | |
| PICU component | |
| 4.2 Specialty specific clinical exposure required to provide sufficient learning opportunities (NB if giving workload data ensure it is explicit whether this is number per annum or number trainee would be expected to be exposed to over entire programme): End of life discussions Training in retrieval | |
| 4.3 Specialty specific requirements for other experiential learning(excluding clinics and ward rounds): Early access to training in the operating theatre, supervised by a consultant anaesthetist. Experience of renal replacement therapy, HFOV, iNO, non-invasive and invasive ventilation, ICP monitoring, ultrasound guided line placement, end-of-life discussions with parents | |

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| 5. Working patterns | |
| For both PICU and DGH or tertiary centre HDU components | |
| 5.1 Safe cover arrangements for paediatric department out of hours in line with RCPCH guidance | |
| 5.2 Evidence of compliance with existing employment rules to working time | |
| 5.3 Working intensity and pattern that is appropriate for learning | |
| 5.4 Access to sub-specialty training time which allows achievement of competences throughout the programme | |
| 5.5 This post forms part of a complete paediatric training programme which provides a minimum of 5 years of acute clinical experience, including out of hours duties | |

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| 6. Specific Post requirements | |
| For the total programme | |
| 6.1 It is recommended that a minimum of 12 months working in a PICU | |

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| and 12 months in a large DGH or a tertiary centre that has designated HDU beds as part of a regional network. | |
| 7. Enabled to learn new skills, necessary skills and curriculum coverage (speciality specific) <i>This section can be used to highlight marker conditions to which trainee should be exposed or the numbers of cases/procedures that trainee will be expected to see/do. Ensure that it is clear whether any numbers are for whole training programme or per annum</i> | |
| For both PICU and DGH or tertiary centre HDU components | |
| 7.1 Specialty specific marker conditions trainee should be exposed to: as per 'A Framework of Competences for the Level 3 Training Special Study Module in Paediatric High Dependency Care' | |
| 7.2 Specialty specific skills/procedures trainee needs to complete: as per 'A Framework of Competences for the Level 3 Training Special Study Module in Paediatric High Dependency Care' | |
| 8. Access to clinics and ward rounds and long term care of patients | |
| 8.1 Specialty specific numbers and types of clinics expected to attend (including outreach clinics): | |
| 8.2 Specialty specific combined clinics expected to attend: | |
| 8.3 Specialty specific ward rounds consultant led and independent per week: 2 consultant led ward rounds each day Opportunities for trainee to lead ward rounds | |
| 8.4 Specialty specific involvement in transitional care: | |
| 8.5 opportunity to participate in outreach activities | |
| 9. Meetings | |
| For both PICU and DGH or tertiary centre HDU components | |
| 9.1 Specialty specific number and types of MDT meetings expected to be exposed to: Regular clinical practice meetings PICU or HDU strategy and business planning | |
| 9.2 Specialty specific multi-professional meetings expected to be exposed to: Discharge planning of complex cases Critical incident review | |
| 9.3 Specialty specific other meetings: Audit meetings | |
| 10. Clinical audit | |
| For both PICU and DGH or tertiary centre HDU components | |
| 10.1 Evidence of trainees participation in clinical governance (at least 1 full audit/year and attendance at critical incident meetings) | |
| 10.2 Evidence of trainees participation in clinical guideline development | |
| 10.3 the regional unit participates in national PICU audit | |

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| 11. Teaching appraising and assessing | |
| For both PICU and DGH or tertiary centre HDU components | |
| 11.1 Opportunities for formal and informal teaching | |
| 11.2 For senior trainees: opportunities for involvement of assessment of others | |
| 11.3 For senior trainees: opportunity to be involved in the appraisal of others | |

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| 12. Research | |
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| 13. Management | |
| For both PICU and DGH or tertiary centre HDU components | |
| 13.1 Opportunities to be involved in management e.g. participation in management meetings and projects | |
| 13.2 Senior trainee has opportunity to co-ordinate patient care and to take responsibility of the unit | |

| X-ref | Comments |
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