



High Dependency Care for Children - Time To Move On

A focus on the critically ill child pathway beyond the Paediatric Intensive Care Unit

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Association of Paediatric Anaesthetists of Great Britain and Ireland
British Association of General Paediatricians
Faculty of Intensive Care Medicine
Intensive Care Society
NHS England representatives
Paediatric Intensive Care Society
Royal College of Anaesthetists
Royal College of Nursing
Royal College of Paediatrics and Child Health
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A focus on the critically ill child pathway beyond the Paediatric Intensive Care Unit

A set of recommendations to improve the care of the critically ill child

Drawn up by a multidisciplinary working group including Association of Paediatric Anaesthetists of Great Britain and Ireland, British Association of General Paediatricians, Faculty of Intensive Care Medicine, Intensive Care Society, Paediatric Intensive Care Society, Royal College of Anaesthetists, Royal College of Nursing, Royal College of Paediatrics and Child Health, WellChild and NHS England representatives.



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Endorsements

- Association of Paediatric Anaesthetists of Great Britain and Ireland
- British Association of General Paediatrics
- Faculty of Intensive Care Medicine
- Intensive Care Society
- Paediatric Intensive Care Audit Network
- Paediatric Intensive Care Society
- Royal College of Anaesthetists
- Royal College of Nursing
- WellChild



BAGP British Association of General Paediatrics

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List of acronyms

BLS	Basic Life Support
CCT	Certificate of Completion of Training
CCG	Clinical Commissioning Group
CC	Critical Care
CPAP	Continuous Positive Airway Pressure
CPD	Continuing Professional Development
CRG	Clinical Reference Group
ECMO	Extra Corporeal Membrane Oxygenation
EWG	Expert Working Group
HDC	High Dependency Care
HQIP	Health Quality Improvement Partnership
HRG	Healthcare Resource Group
LAT	Local Area Team
LTV	Long-Term Ventilation
ODN	Operational Delivery Network
PbR	Payment by Results
PCC	Paediatric Critical Care
PCCMDS	Paediatric Critical Care Minimum Care Dataset
PCCU	Paediatric Critical Care Unit
PEWS	Paediatric Early Warning Score
PIC	Paediatric Intensive Care
PICS	Paediatric Intensive Care Society
PICANet	Paediatric Intensive Care Audit Network
PICU	Paediatric Intensive Care Unit
QAA	Quality Assurance Accredited
RCPCH	Royal College of Paediatrics and Child Health
SCT	Specialised Commissioning Team
SUS	Secondary User Service
SWACIC	South-West Audit of Critically Ill Children

Foreword

Considerable progress has been made in delivering intensive care for children since the 1997 report 'Framework for the Future', including provision of high-quality acute stabilisation of the critically ill child in the District General Hospital prior to transfer to intensive care (Tanner report 2006, Paediatric Intensive Care Society (PICS) Standards 2010). However ongoing care of the critically ill child outside of the Paediatric Intensive Care Unit (PICU) has not progressed to the same degree, with considerable inequity across the UK in how a child who requires High Dependency Care is managed.

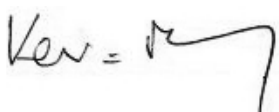
This report contains a number of clinician recommendations which it is hoped will result in improved delivery of safe, high-quality Critical Care (CC) outside of PICU. It emphasises the vitally important role of an effective Paediatric Critical Care (PCC) Operational Delivery Network (ODN) in delivering this objective.

The working group, representing a wide range of stakeholder groups, has made in excess of 60 recommendations covering terminology and definitions, clinical pathways and networks, advice and transportation, staffing and competencies, standards, audit and governance, and commissioning and funding. Some are recognised to be challenging to deliver in the immediate term but at the same time vitally important if we are to move on from the current position.

At the centre of the recommendations is the child and their family and the goal to provide them with the best care as close to their home as possible. A full description of what a PCC service should be delivering for children, young people and their parents in relation to information and communication, practical needs and facilities is beyond the scope of this document but should be covered in the next revision of the Paediatric Intensive Care Society Standards, which should also be informed by the recommendations contained in this report. Throughout this document the words 'children', 'child' and 'paediatric' refer to a neonate, infant, child or young person in hospital. This document is intended for clinical staff who care for critically ill children, for their managers who have a responsibility to ensure that a safe, high-quality service is delivered, and for those who are involved in the commissioning of paediatric services. The latter group hold the key to delivery of many of the key recommendations contained in the report.

The document focuses on delivery of CC to children in England, as it is closely tied to commissioning of services and establishment of networks which are commissioned differently outside of England. However we hope that many of the key recommendations will be equally relevant in Northern Ireland, Scotland and Wales.

We hope you agree that it is 'time to move on'.



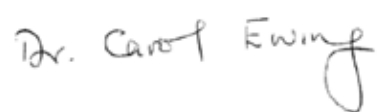
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1. Executive summary

1.1 Background

- 1.1.1** There is considerable inequity across the UK in how a critically ill child who requires High Dependency Care (HDC) is managed. The same child may be cared for locally within a regional hospital in one part of the country but require transfer to a regional Paediatric Intensive Care Unit (PICU) in another. This may in turn require the child to be anaesthetised, intubated and ventilated for transfer, adding complexity, risk and cost which is potentially avoidable.
- 1.1.2** A number of factors contribute to this inequity. These include differences in staffing resources, staff training and competence, and bed capacity. Furthermore, inconsistency of funding models and poorly described local Critical Care (CC) pathways can result in inequitable provision of HDC. The introduction of Paediatric Critical Care (PCC) networks would facilitate improvements and formalise pathways, education and training.
- 1.1.3** Safer provision of care for critically ill and complex babies and children outside of PICU would greatly benefit the whole population of patients throughout stages of their illness and/or post-operative course, and would reduce the strain on PICU bed capacity so that it is better able to cope with demand which is increasing year on year.
- 1.1.4** A focus on the child and the complete CC pathway has been missing, with much attention paid to the intensive care elements at the expense of progress being made with the elements of the pathway delivered outside of PICU.
- 1.1.5** The term HDC has historically been used to mean different things in different hospitals. A child who is not critically ill may have been classified as requiring HDC based solely on a requirement for additional nursing resources. Whilst many of these children will continue to require enhanced nursing supervision they should be differentiated from the group of children who are critically ill.
- 1.1.6** It is time to move on and to focus on the child, their journey through a CC pathway, and how the different elements of the pathway can be delivered across a PCC Operational Delivery Network (ODN).
- 1.1.7** Significant change is needed. A total of 69 recommendations are described which will require a commitment for change from a range of stakeholders. Some will need to be phased over time. Appendix 13 presents all 69 recommendations along with a suggested timescale for their implementation.

NOTE: The scope of this report does not include the care of children within intensive care units, whether paediatric or general/adult unit, the acute resuscitation of children, or the acute stabilisation of a child who requires PICU transfer. Well established guidance for these situations already exists (Tanner report 2006, PICS Standards 2010, Advanced Paediatric Life Support (APLS)), with a focus on collaborative working between anaesthesia, intensive care, emergency department staff and the paediatric team.

1.2 Terminology

- 1.2.1** A change in terminology is proposed away from HDC and Paediatric Intensive Care (PIC) to three tiers of PCC: Level 1, Level 2 and Level 3 CC, with Level 1 and Level 2 CC capturing activity that would previously be described as HDC.

1.3 Classification of Paediatric Critical Care Units (PCCUs)

- 1.3.1** All hospitals admitting children should be able to deliver Level 1 CC in a defined CC area, classified as a Level 1 PCCU.
- 1.3.2** A more limited number of hospitals should be designated as a Level 2 PCCU and be able to deliver Level 2 care to children within a defined CC area.
- 1.3.3** Severely ill children requiring Level 3 CC will continue to be admitted to PICU (Level 3 PCCU).

1.4 Staffing

- 1.4.1** Training and competency requirements for both nursing and medical staff are proposed which are consistent with the distinction between Level 1 and Level 2 PCCUs, with higher expectations for Level 2 units.
- 1.4.2** The requirements for Level 2 PCCUs are a step-up from the current position but are required in order to deliver safe, effective, high-quality care to this patient group.
- 1.4.3** There is recognition that some of the proposed staff competency and training standards may prove challenging to achieve in the immediate term. Rather than dilute down the required standard it is proposed that networks see these targets as developmental and agree on a timescale after which standards should be met.

1.5 PCC ODNs and configuration of CC services across a network

- 1.5.1** The development of more formal PCC ODNs, to develop pathways for Level 1, 2 and 3 CC, long-term ventilation (LTV), transport and Extra Corporeal Membrane Oxygenation (ECMO) is essential, to align with neonatal and adult CC ODNs.

Many of the recommendations contained in this report will not be deliverable without a formal PCC ODN.

- 1.5.2** Each PCC ODN, collaborating with their host commissioning team, should be responsible for designating the Level 1, Level 2 (and Level 3 [PICU]) PCCUs across its network.
- 1.5.3** Network responsibilities must include monitoring of adherence to standards, including staffing levels and training/competencies.

1.6 Clinical pathways and progression between CC levels

- 1.6.1** Patients may need to step-up and step-down between CC levels according to their clinical condition. A system is required that facilitates this and is able to provide expert advice to clinical staff working across the network.
- 1.6.2** Advice, decision support, triage and transportation should be provided through existing PCC transport services as they are already providing this service for other critically ill children and have the necessary expertise to do so.
- 1.6.3** A number of indicative clinical pathways are described to provide examples of how the network approach and transition across levels of CC could function, though individual networks will need to agree pathways and trigger points for their network taking into account geographical and other factors.

1.7 Definitions

- 1.7.1** The Paediatric Critical Care Minimum Care Dataset (PCCMDS) should be used to define the interventions that map to Level 1, 2 and 3 CC.
- 1.7.2** The current system of seven CC Healthcare Resource Groups (HRGs) (Basic, Intermediate, Advanced [5 levels]) should continue to be used with Basic and Intermediate CC HRGs describing activities that are undertaken in Level 1 and Level 2 units respectively.
- 1.7.3** The PCCMDS and HRGs should be reviewed regularly by the HRG Expert Working Group (EWG) and modified as required. The body responsible for supporting necessary updates to PCCMDS and the PCC HRGs should be identified.

1.8 Measuring activity

- 1.8.1** Each PCC ODN should coordinate the collection of CC activity, through collection of the PCCMDS, across all PCCUs in their network (Level 1, 2 and 3 units).

1.9 Transportation

- 1.9.1** Existing PCC transport services should be responsible for providing advice, decision support and triage to their CC network, to include children requiring Level 1 and Level 2 CC, and, where necessary, transporting a child to the most appropriate CC area. Transport/retrieval requirements must be reviewed within each PCC ODN and be commissioned appropriately.

1.10 Setting standards and defining quality

- 1.10.1** A national set of standards for CC is needed that will capture the key recommendations of this document and allow PCC ODNs to benchmark their PCCUs. A revision of the current PICS Standards for the Care of the Critically Ill Child (2010) should be considered to incorporate these recommendations.
- 1.10.2** In the interim a draft set of standards are included in Appendix 8.

1.11 Audit and governance arrangements

- 1.11.1** Audit of the service should include all CC activity that occurs within the PCC ODN. Networks will be responsible for ensuring this happens. On a national scale the goal should be to expand the scope of the Paediatric Intensive Care Audit Network (PICANet) to collect CC activity occurring outside of PICUs. In the first instance it is suggested that collection of data from Level 2 units be introduced. PICANet will require additional resources to facilitate this.
- 1.11.2** The governance responsibility for the delivery of safe, high-quality CC services across the network should lie principally with the individual service providers, supported by the Local Area Team (LAT) and the host of the PCC ODN.

1.12 Commissioning arrangements and designation of CC units

- 1.12.1** All PCC activity should be commissioned as CC activity and be seen as separate from routine care.
- 1.12.2** At present a significant proportion of activity undertaken in PICUs maps to HDU level HRGs. More joined up PCC commissioning, which takes into account patient complexity, could release important funds from current PICU funding to support delivery of CC activities outside of PICUs.
- 1.12.3** Agreement needs to be reached between NHS England and Clinical Commissioning Groups (CCGs) regarding how PCC activity is commissioned and funded. Ideally the commissioning of all PCC activity should be overseen by one host, most logically NHS England. A possible approach would be to add in activity in a stepped fashion by adding in commissioning of Level 2 PCCUs in the first instance, with Level 1 PCCUs to follow later.
- 1.12.4** A draft service specification that incorporates Level 1 and 2 CC is proposed.

2. Background - making a case for change

2.1 Historical perspective

- 2.1.1** The focus of this project is the critically ill child and their journey along a clinical pathway.
- 2.1.2** The PICU element of that journey has received a lot of attention in the past 15 years since the publication of 'Framework for the Future' in 1997.
- 2.1.3** Some of the key targets and successes have included centralisation of care, establishment of informal clinical networks, development of improved retrieval services, development of standards for PIC, the collection of activity data across all units (PICANet), and benchmarking of outcomes.
- 2.1.4** Excellent guidelines already exist for the acute stabilisation of the critically ill child who requires urgent admission/transfer to PICU, hence this area is not the focus of this document. The role of emergency department, anaesthesia and general ICU staff in this situation remains paramount.
- 2.1.5** Framework for the Future recognised the need to also focus on the element of the CC pathway outside PICU, specifically the delivery of HDC for children, recognising that effective delivery of HDC would reduce the burden on PICUs and at the same time allow delivery of care closer to the child's home.
- 2.1.6** HDC is described as a requirement for close observation, monitoring or intervention that cannot be delivered in a normal ward environment, but at the same time does not require admission to an intensive care unit.
- 2.1.7** An Expert Advisory Group to the Department of Health delivered the document 'High Dependency Care for Children' in 2001.
- 2.1.8** The document attempted to define different categories of care as well as whether that care is best delivered in a paediatric ward, an HDU co-located with PIC, within a specialist HDU, or within PICU.
- 2.1.9** The report also made specific recommendations about leadership, staffing and training, along with identifying the need to establish audit of HDC activity in order to evaluate performance and outcomes.

2.2 Barriers to progress since 2001

- 2.2.1** Whilst some progress has been made to achieve the key recommendations of the 2001 report, there is still considerable work to do. It is anticipated that the new NHS architecture and the establishments of national Clinical References Groups will help to drive the PCC agenda forward.

2.2.2 An unknown volume of HDC is being delivered across a wide variety of settings and locations, often disconnected from any formal links into a local PIC network, and with poor information about activity levels and patient outcomes. A key priority is to establish robust collection and reporting of HDC activity data and through the service specification achieve standardisation of HDU provision nationally.

2.2.3 Potential factors that have hampered progress include:

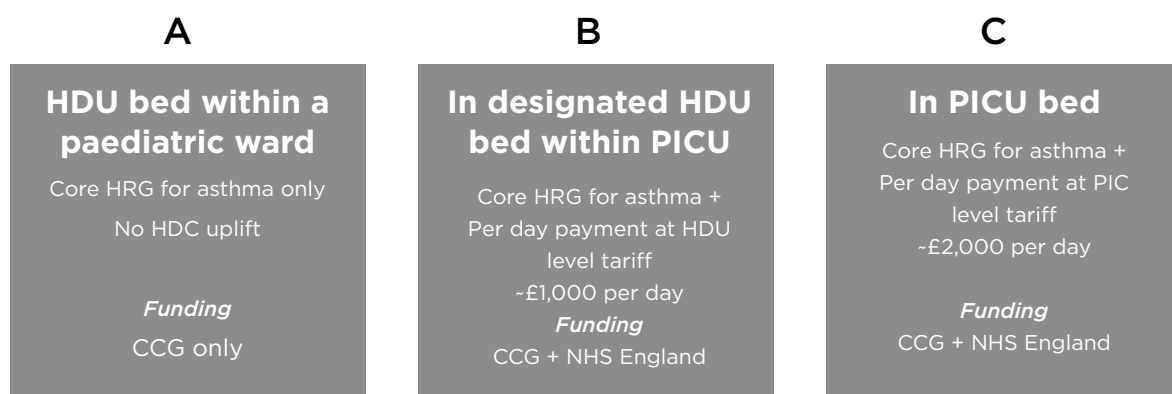
a) A lack of consensus on how to define HDC such that a wide range of different definitions and tools are in use.

A number of excellent regional audits of HDC activity have been carried out but each one has used a different HDC tool containing anywhere between 23 and 50 items, making a comparison between studies impossible.

Region	When?	How many centres?	Criteria for HDC	HDU as % of total admissions
South West	2001 - present	16	23	4.4%
Yorkshire	Jan - Dec 2005	14	36	10%
Scotland	Nov 2006 - Oct 2007	39	50	9%
Wessex	Dec 2009 - Nov 2011	10	24	unknown

b) Different commissioning and funding approaches for HDC activity.

A case is described which highlights the inconsistency of funding that currently exists. A six-year-old child is admitted to the Emergency Department with acute severe asthma and fails to respond to initiation of steroids and nebulised salbutamol therapy. He is admitted for close monitoring and to be started on intravenous aminophylline and salbutamol infusions. The diagram below summarises the funding differences that exist according to where this care is delivered showing a) care delivered in a high dependency bed within a paediatric ward, b) in a designated HDU bed within PICU and c) in a PICU bed. These represent models that all co-exist in the current system.



No additional 'CC' funding is available in model a) (though local arrangements may exist in a few areas) whilst model b) may attract an HDU bed-day payment equating to ~£1,000 per day and c) attracts a PICU bed-day payment equating to ~£2,000 per day.

c) No ring-fenced additional income for HDC activity delivered outside PICU, providing a disincentive for Trusts and clinicians to undertake HDC activity.

This boy with severe asthma would demand significant medical and nursing resources related to close observation and monitoring, and preparation and delivery of continuous infusions. Within a ward environment with limited staff resources, such as a general paediatric ward, diversion of staff resources to deliver this level of care could result in a diversion of care away from other patients and may lead to a closure of ward beds, thereby affecting ward capacity. In turn this can adversely impact on patients ready for repatriation from PICU.

The Clinical Reference Group (CRG) will need to work with the national Payment by Results (PbR) team to drive consistent currency and pricing for CC as soon as is possible so as to avoid disparity in staffing resources and to drive equity.

d) A focus on PICU rather than on the whole pathway of critical illness.

This is confounded by the fact that formal managed networks for PCC have not existed and informal networks have generally been focused on the PIC element of care.

In order to drive improvements across the whole CC pathway it is imperative that networks focus on the whole pathway, not only on the acute intensive care element. A good example of this is seen in Neonatal Care where pathways and network models focus on all levels of care and ensures that a neonate is seen in the right unit at the right time.

2.3 The current landscape

2.3.1 These factors have contributed to a landscape in which there is considerable variability in delivery of HDC for children across different Trusts. Variable delivery of CPAP (Continuous Positive Airway Pressure) support for infants with respiratory failure is an excellent example of this and is highlighted in Appendix 1. Failure to deliver appropriate HDC interventions can increase demand for PICU beds and may take the child and family further away from their home.

2.3.2 Data from PICANet show that around 28% of children who are admitted to PICUs do not require either invasive ventilation (delivered via an endotracheal tube) or non-invasive ventilation (delivered via facemask or other device). Furthermore this percentage varies widely across different units (range 9 to 61%). Many of these children could be looked after in a CC environment outside of PICU given the right staff resources and the right staff competencies.

2.3.3 Using the current HRG definitions of HDC PICANet data demonstrate a wide range of HDC activity being undertaken in PICUs across England from 16 to 91% of total bed-day activity (overall average 33%), most probably reflecting local variation in the threshold for PICU admission. PICANet data also show a large regional variation in the number of children admitted to PICU from 92 per 100,000 in the South West to 205 per 100,000 in the North East. It is unclear how much of this is explained by case-mix and population factors, such as levels of social deprivation, and how much reflects regional differences in managing critically ill children outside the PICU in high dependency areas. Of note the South West has a mature network for PCC in operation and has identified and funded a number of HDU beds within

regional hospitals. The South-West Audit of Critically Ill Children (SWACIC) data shows clearly that this has allowed delivery of non-invasive respiratory support to babies with RSV bronchiolitis in the regional hospitals, reducing the numbers being transferred to Bristol PICU each winter. This keeps families closer to home and reduces the burden on PICU beds over winter when the system is often close to 100% capacity.

- 2.3.4** Children on LTV also create challenges in the system. There are around 900 children across the UK who require medium (months) to long term (years) ventilation delivered either via a facemask or a tracheostomy. This number is increasing. Examples include infants with bad chronic lung disease associated with prematurity, children with neuromuscular disorders, such as Spinal Muscular Atrophy or Duchenne Muscular Dystrophy, children with spinal cord injury, children with severe airway abnormalities, and children with disorders of respiratory drive. Currently some of these children can remain in a PICU bed for months, or even years, waiting on the establishment of a care team, housing adaptations and other requirements. During much of this time they will be 'stable' and could have their care delivered outside of PICU (closer to home) if only regional hospitals had the necessary resources and staff training to care for a child with a tracheostomy on a ventilator. This is rarely possible within the current system.
- 2.3.5** Furthermore, once home if a child on LTV becomes less well, for example develops a chest infection, and requires hospital admission for antibiotics and physiotherapy they will frequently require readmission to their regional PICU as there are seldom staff with the right training and competencies to care for them at a hospital closer to home.
- 2.3.6** This needs to change and is possible if the recommendations contained in this report are adopted. The combination of reducing demand on PICU beds by caring for children requiring acute non-invasive ventilation (including CPAP) and children requiring LTV within a CC environment closer to their home would have a profound impact on PICU bed capacity and at the same time keep the child and family closer to home.
- 2.3.7** This is not achievable without a significant up-skilling of staff to enable them to feel confident to look after these patient groups. We believe this is achievable provided the staff and resources are concentrated in a limited number of sites – it would not be deliverable across all in-patient sites.

2.4 Audits of HDC/PCC

- 2.4.1** There are excellent examples of how HDC care can be incorporated into the core business of a PCC network, most notably in the South West, who have collected regional data on both PIC and HDC activity for the past 10 years with the support of commissioners who fund a data collector in each DGH.
- 2.4.2** A number of excellent short-term regional audits/studies have been undertaken.
1. A one-year audit of HDC activity across all of Scotland in 2006 used a 50 item tool developed for the audit and found that 4,804 children across 38 hospitals met the criteria for HDC, 9% of hospitalised children. This equated to 22,417 bed-days of HDC activity in 2006. Over 80% of the activity was delivered within the tertiary children's hospitals, much of it within two

PICUs in Edinburgh and Glasgow. The audit, commissioned by the Scottish National Services Division, made a number of recommendations in keeping with the recommendations of this report, notably the establishment of a regional PCC network, the development of minimum standards for HDC, and the need to consider the transfer of some children requiring HDC to larger district hospitals.

2. A study of HDC activity across 14 hospitals in Yorkshire in 2005 used a 36 item HDC tool developed for the purposes of the study and found 8-12% of children across DGHs met their criteria for HDC. Again a significant proportion of the activity was within tertiary centres and within PICU. They extrapolated their findings to estimate that 63,434 HDC bed-days would be delivered nationally each year.
3. Data from the SWACIC in 2010 reveal that 4.4% of children across 16 hospitals met criteria for HDC using a 23 item tool more closely related to the PCCMDS than the above studies. Across eight hospitals with designated HDU beds 1,708 children were admitted in 2010 and occupied 2,749 HDU bed-days, representing a mean length of HDU episode of only 1.6 days.
4. PCCMDS and PCC HRGs were used to audit HDC activity across six regional hospitals and one tertiary children's hospital in the West Midlands in 2010/11 using a detailed observational study. ~8% of children met the criteria for HDC. The audit targeted the ward areas of highest patient acuity over winter and therefore may have overestimated the true picture.

Importantly the West Midlands study found that children meeting HDC HRG criteria consumed significantly more staff time than other ward patients (approximately 2.5 fold increase) and demonstrated greater physiological derangement on Paediatric Early Warning Score (PEWS) monitoring. These findings suggest that the existing PCCMDS and HRGs are able to identify a group of children needing more staff input and consuming more resources, highlighting the importance of additional funding following the activity. Of note the bedside staff costs associated with delivering basic CC interventions was similar to that required to deliver intermediate CC interventions, and the staff costs to deliver care in a cubicle were no greater than to deliver care on the ward.

5. In 2011 an audit from the Wessex region using HRGs showed that the majority of episodes of HDC were related to respiratory interventions and again found that in most cases the requirement for HDC was less than 48 hours.

2.4.3 These audits have established that ~4-8% of children admitted to paediatric wards meet HDC criteria, that the majority of HDC spells are short (less than two days), and have confirmed that these children consume significantly more staff resources than other admitted children, supporting the need for funding to follow this activity.

2.5 Staff competencies for HDC

- 2.5.1** A consistent recommendation and expectation until now has been that any hospital delivering in-patient paediatric care should be able to look after a child requiring HDC (as well as being able to initiate acute stabilisation for a child requiring transfer to PICU) (PICS Standards 2010).

- 2.5.2** This rather assumes that there is only one 'level' or 'intensity' of HDC and that it is reasonable and appropriate for any hospital to be able to deliver it.
- 2.5.3** Recommendations regarding staff competency and training requirements have been influenced by this and have generally been set at a rather low level consistent with what is currently possible in all hospitals.
- 2.5.4** The PICS Standards published in 2010 included a limited number of recommendations relating to the minimum nursing and medical staff training and competence levels to care for a high dependency child. They state that every nurse should have up to date resuscitation training and that there should be a medical trainee on call at all times who is ST3 or above.
- 2.5.5** The above regional audits found that even these minimum standards are not being met in a significant proportion of ward areas.
- 2.5.6** In this process we have considered issues and challenges relating to current service configuration but this has not prevented recommendations being put forward which are felt to be important if we are to achieve the best outcomes for children requiring CC interventions. The likelihood is that we will see significant service reconfiguration in the coming years, not least in paediatrics, so that some of the current potential challenges to implementation or change may be removed or become less of a challenge as a result. We would stress that the proposals should be seen as developmental and may take a number of years to achieve across all networks.

2.6 Terminology

- 2.6.1** HDC is a term which is used correctly to describe the child who is critically ill requiring enhanced observation, monitoring and intervention but also is used to describe the child who is not critically ill but requires additional nursing care for other reasons. An example would be the combative child after a head injury requiring close supervision, or the child who is receiving a number of intravenous medications which require preparation and checking. Whilst these are situations which will impact on the staffing levels required on a ward they are not relevant to a discussion about care of the critically ill child outside PICU, and need to be considered using a different approach.

2.7 Why now is a good time to refocus on HDC for children

- 2.7.1** A number of opportunities exist now and in the next few years.
- 2.7.2** New commissioning arrangements provide an opportunity to introduce more logical, joined up commissioning of all CC services for children. Service specifications are being developed for PIC, HDU, LTV, transport and ECMO.
- 2.7.3** Networks are seen as vital to the delivery of high-quality care in the coming years. A network for Maternity and Children's Services is one of a limited number of Strategic Clinical Networks being established from 2013/14. In addition there will be a series of ODNs, with CC being one of the areas highlighted. Adult and neonatal CC ODNs have been implemented from 2013/14,

reflecting the pre-existing managed networks and associated funding for these areas. PCC ODNs have not yet been widely implemented, though some LATs are developing PCC network structures. It is imperative that PCC ODNs become established in all areas in 2015/16.

- 2.7.4** The Safe and Sustainable Programme recommendations to establish networks for paediatric cardiac services and paediatric neurosurgery will also require appropriate CC ODN support.
- 2.7.5** A number of working groups were set up in 2012 and 2013 by the Department of Health and the National Specialist Commissioning Team to promote discussions on transport/retrieval, ECMO provision, and PIC/CC capacity issues, recognising the need for a more coordinated approach to all CC activities for children and the winter PICU capacity pressures that occur year on year.
- 2.7.6** Establishment of a minimum dataset and HRGs for PCC provide a national definition and currency for all CC activities, including HDC. All Trusts undertaking CC activity are required to submit activity data through the Secondary Users Service (SUS) so that activity can be measured, and to submit reference costs for that activity to the Department of Health PbR team, allowing the activity to be costed.
- 2.7.7** Work undertaken by RCPCH and the Academy of Royal Medical Colleges provides recognition of the need to reconfigure acute services in the near future with fewer in-patient services, allowing a greater concentration of trainee and consultant medical staff resources. In addition there has been greater recognition of a role for advanced practitioners in being able to augment the in-patient care provided historically by medical trainees.
- 2.7.8** In 'Facing the Future' the RCPCH envisage significant reconfiguration of services over the coming years, with between 48 and 76 sites closing to 24/7 in patient paediatrics, in order for services to remain safe and sustainable.
- 2.7.9** The last 10 years has seen the development of a number of appropriately resourced retrieval/transport services for critically ill children in different parts of the UK, and the delivery of safe, high-quality transportation. In many instances these services, and/or the regional PICUs, have been taking on a greater role in supporting and advising colleagues within regional hospitals in the management of a critically ill child who does not require PICU. They are well placed, with modest additional resources, to play a more consistent role in this area.
- 2.7.10** The last 10 years has also seen improved collaborative working between paediatrics, emergency medicine, anaesthesia and intensive care in delivering improved acute stabilisation of the deteriorating child prior to transfer to PICU. The standards and guidance relating to this aspect of care are well described (PICS Standards 2010, Tanner report 2006) and the recommendations contained within this report should not alter existing processes. Specifically, input of anaesthesia/CC colleagues within regional hospitals will continue to be essential.

3. Classification of Paediatric Critical Care (PCC)

3.1.1 As alluded to above a change in terminology is proposed, moving away from the term HDC or HDU to a description of different levels of CC. This is more in keeping with terminology used in other countries and in adult CC services within the UK.

3.1.2 The rationale for this change is:

- There is considerable historical 'baggage' and confusion associated with the term HDU at clinical staff, commissioner and DH levels
- The term fails to discriminate the 'highly dependent' patient from the critically ill patient
- A large number of different local tools have been developed to define HDC
- We should be aiming for a better alignment and consistency in nomenclature with neonatal and adult CC services.

Levels of care

3.1.3 It is proposed that two levels of CC (Level 1 and Level 2) be used to describe activities which would have previously been described as HDC.

Level 1 CC will be used to describe activities which should be delivered in any hospital which admits acutely ill children and will focus on the commoner acute presentations and clinical scenarios that require an enhanced level of observation, monitoring and intervention than can be safely delivered on a normal ward. Note: short-stay units or observation units, providing daytime care only, are not expected to deliver Level 1 CC or to meet the recommendations within this report.

Level 2 CC will be used to describe more complex activities and interventions which are undertaken less frequently, to children with a higher level of critical illness, and demand the supervision by competent medical and nursing staff who have undergone additional training.

Level 3 CC will be used to describe activities that should only be undertaken within PICUs.

The interventions mapping to Levels 1, 2 and 3 CC are described in Appendix 9. These interventions are contained within the PCCMDS and map to seven levels of PCC HRG for commissioning and PbR purposes.

3.1.4 The table below summarises the relationship between levels of CC and the associated PCC HRGs.

Level of care	HRG definition
Level 1	Basic CC
Level 2	Intermediate CC
Level 3	Advanced CC (1)
	Advanced CC (2)
	Advanced CC (3)
	Advanced CC (4)
	Advanced CC (5)

3.1.5 At present quite a lot of the activity which these proposals would categorise as Level 2 CC is being delivered in PICU rather than in HDU areas, reflecting the historical failure to 'up-skill' regional hospitals to care for these children. With appropriate resources and staff training these children should be looked after within a regional hospital. This will usually deliver care closer to home and in some cases will avoid the need to escalate care to facilitate the transfer from regional hospital to tertiary hospital PICU. Importantly in the context of increasing demand for PICU year on year and the considerable winter pressures, it will also release valuable PICU capacity for cases which require advanced CC rather than basic and intermediate care.

3.1.6 Examples of Level 2 CC would include the child requiring acute non-invasive ventilatory support for respiratory failure, the child with diabetic ketoacidosis with an arterial line in situ to facilitate regular blood sample monitoring of acid base and blood glucose, the child who is ventilated at home via a tracheostomy who requires admission for intravenous antibiotics for an infection, or the child who has undergone complex elective surgery and requires advanced monitoring and pain relief techniques post-operatively.

3.1.7 It is anticipated that Level 2 CC will not be delivered in every hospital that admits children but will be concentrated in a smaller number of centres. These will typically be larger centres unless there is a geographical requirement for a smaller centre to be able to deliver Level 2 CC.

3.1.8 It is not considered desirable or feasible to put in place a system that aims to deliver Level 2 CC in every hospital that admits children for the following reasons:

- The number of Level 2 cases admitted across a critical network would be insufficient to allow staff working in all centres to gain and maintain the required skills and knowledge.
- In keeping with evidence from other clinical areas it is expected that concentration of clinical cases and resources would deliver better outcomes for critically ill children and their families.
- The costs of providing the enhanced staff training necessary to care for a child requiring Level 2 CC would be difficult to justify across all hospitals.
- It would be difficult to provide the required level of medical staff (or equivalent) cover 24/7 across all hospitals.

3.2 Classification of CC units

3.2.1 In keeping with the three levels of CC described above, units delivering CC for children will be described as Level 1, Level 2 and Level 3 PCCUs.

A **Level 1 PCCU** will exist in every hospital admitting children and will be able to deliver Level 1 CC (basic CC HRG) if required.

A **Level 2 PCCU** will be able to deliver Level 2 CC (intermediate CC HRG) and will not be present in every hospital with in-patient paediatrics. In addition a Level 2 PCCU will be able to deliver Level 1 care.

A **Level 3 PCCU** (a PICU) will be able to deliver Level 3 CC (advanced CC HRGs). In addition a Level 3 PCCU will be able to deliver Level 1 and 2 care.

Whilst the goal should be to deliver Level 1 and Level 2 care outside of PICUs it is recognised that there will be situations when it is deemed clinically appropriate for a child requiring Level 1 or Level 2 care to be looked after within a PICU, rather than in a Level 2 unit.

3.2.2 Situations in which a child might be admitted to a Level 2 PCCU could include the following:

- a child admitted directly to the hospital and requiring Level 2 CC
- a child admitted directly to the same hospital requiring Level 1 care
- a child receiving Level 1 care in a Level 1 unit at another hospital but failing to improve as expected and requires ongoing care
- a child who is in a Level 1 unit at another hospital but is deteriorating and now requires 'step-up' to Level 2 CC
- a child who is ready for discharge from a PICU (Level 3 unit) but needs to 'step-down' for ongoing CC support.

3.2.3 It is not expected that every Level 2 unit will be able to deliver all Level 2 interventions (Appendix 9) as some of these interventions are likely to be limited to tertiary paediatric centres. Examples would include care of the child undergoing intracranial pressure monitoring or acute renal replacement therapy. However, as a minimum, every Level 2 PCCU situated within a regional hospital should be able to deliver acute (and chronic) non-invasive ventilation (both CPAP and bi-level support) and to care for a child with a tracheostomy on LTV.

3.2.4 Within a tertiary children's hospital HDC has historically been delivered using different models. In some centres all HDC is delivered within a single multi-specialty HDU, which may or may not be co-located with the PICU, whilst in other centres a more disperse model is employed with HDU beds co-located within a number of specialty-specific ward areas.

It is not the intention of this report to make recommendations about which model should be used. However in order for a specialty specific area to be designated as a Level 2 PCCU the staff (medical and nursing) working within that unit would be expected to meet the standards required of any Level 2 PCCU, and other relevant standards would also need to be met.

3.2.5 The PCC ODN, working closely with commissioning teams, will be responsible for designating Level 1 and Level 2 PCCUs as well as making recommendations about what interventions are undertaken in each unit across the network.

Labeling/badging of Level 1, 2 and 3 units

3.2.6 Each PCC ODN should agree on the terminology to be used within its network to describe Level 1, Level 2 and Level 3 units, that is to say what to put on the 'sign above the door'.

3.2.7 A number of potential options are described in the table below. From a parent perspective differentiation between units of differing level is seen as important and therefore a blanket term of CC Unit is not recommended. Similarly continuing use of the term 'High Dependency Unit' to describe both Level 1 and Level 2 units is not recommended. Complete avoidance of the term HDU would help to separate new structures from old and avoid potential misinterpretation.

The term PICU is so well established and well understood that changing this description is considered to be unhelpful.

Level 1 PCCU	Level 2 PCCU	Level 3 PCCU
Basic Critical Care Unit	Intermediate Critical Care Unit	Advanced Critical Care Unit
Enhanced Care Unit	Critical Care Unit	Intensive Care Unit
Special Care Unit	HDC Unit	

3.2.8 The preferred terminology of the Working Group is:

Level 1 PCC unit	Enhanced Care Unit
Level 2 PCC unit	Critical Care Unit
Level 3 PCC unit	Intensive Care Unit

Throughout this document the phrase PCCU includes Levels 1 to 3. There is no distinction to the size of these units but they must be geographically identifiable as separate from the normal ward area.

3.3 Progression between CC levels

3.3.1 A child may step up and down between CC levels and units as they progress along their clinical journey until they are ready for normal ward care and subsequent discharge home.

3.3.2 As described above should a child who is admitted to a Level 1 unit fail to respond as expected or deteriorate then their care would need to be escalated to a Level 2 or Level 3 unit, as appropriate.

3.3.3 Triage of such cases will be required to determine the most appropriate destination for that child, bearing in mind that Level 2 units will exist within a larger regional hospital (without a co-located PICU) and also within the tertiary centre with a co-located PICU. If it is felt that a child is at significant risk of further deterioration requiring admission to a PICU it might be considered more appropriate to triage that child to a Level 2 unit (or Level 3 unit) within the tertiary centre.

This is likely to be the situation in cases of worsening respiratory failure which are assessed as being at risk of requiring invasive ventilatory support.

3.3.4 Appropriate advice, decision support and triage will require skilled and experienced staff to make the right decision. As they are already doing this on a daily basis it is proposed that existing PCC transport/retrieval services are used to provide advice to local teams, and to

triage the most appropriate destination for a critically ill child requiring transfer for Level 2 and 3 CC support.

- 3.3.5** It is proposed that existing PCC transport teams/services should move critically ill children between PCCUs. In some areas of the UK this is already happening but this will need to be standardised and appropriately resourced.

Recommendations

1. The terms Level 1, Level 2 and Level 3 CC should be used to describe escalating levels of CC, with Level 1 and Level 2 care capturing activity that would previously be described as HDC.
2. The term HDC should no longer be used to describe a level of care. For the child who requires considerable staff input but who is not critically ill the term 'high nurse dependency' should be used.
3. All hospitals admitting children should be able to deliver Level 1 CC in a defined critical care area, classified as a Level 1 PCCU.
4. A more limited number of hospitals should be designated as Level 2 PCCUs and be able to deliver Level 2 CC (as well as Level 1 CC) to children within a defined CC area.
5. A Level 2 PCCU within a regional hospital should be able to deliver acute (and chronic) non-invasive ventilatory support, and be able to care for a child on LTV via a tracheostomy.
6. The PCCMDS should be used to define the interventions that map to Level 1, 2 and 3 CC.
7. The PCCMDS should be reviewed regularly by the HRG EWG and modified as required to ensure it remains a valid tool. It is imperative that additional interventions identified by the EWG are added to PCCMDS and the HRG Grouper so that CC activity can be accurately measured.
8. The body responsible for supporting updates to PCCMDS and the PCC HRGs should be identified. This would include providing the funds required to allow updates.
9. The current system of seven CC HRGs should continue to be used (Basic, Intermediate, Advanced [5 levels]), with Basic and Intermediate CC HRGs describing activities that are undertaken in Level 1 and Level 2 units respectively.

4 Paediatric Critical Care (PCC) networks and configuration of Critical Care (CC) services across a network

- 4.1** At present most regions of the UK have an informal clinical network in existence which focuses on children in that region who require PIC support, including the element of acute stabilisation in the regional hospital before transfer to PICU. In many areas these networks have been able to deliver outreach teaching and training for regional hospitals, rotational training opportunities for regional hospital staff, feedback on individual clinical cases, and in some cases regular meetings for all hospitals in the region. Some areas of the UK have well-developed networks which have extended their remit beyond PICU and consider other critically ill children who do not require PICU but remain in their local hospital. The SWACIC group has recently published their 10-year experience and shows what an appropriately configured and resourced CC network for children can deliver.
- 4.2** Networks are seen as a success story for the NHS in delivering coordinated high-quality care, in the right place, for patients. A number of Strategic Clinical Networks have been established, one of which covers maternity and children's services. Below this a number of ODNs will be supported, including CC networks. Those for neonatal and adult CC have a head start in already being in existence and having resources. Disappointingly PCC ODNs have not yet been established, but will hopefully follow in 2015/16. They will be essential if we are to move beyond a focus on PICU and think about the entire CC pathway, support delivery of CC closer to home and free up much needed PICU capacity.
- 4.3** The proposals within this document rely heavily on a functional CC ODN for children. A detailed description of the network's roles and responsibilities is given in Appendix 2. Of note the PCC ODN will be responsible for assisting commissioning teams in decision making on where CC for children should be commissioned across the network, which sites should operate as Level 1 and Level 2 CCUs, monitoring of sites for compliance against standards, monitoring of activity, performance and outcomes, and supporting training needs.
- 4.4** Each ODN will also be responsible for agreeing the terminology to be used on the 'sign above the door' of each PCCU in their network (see 3.2.6). It is envisaged that a Level 3 PCCU will continue to be referred to as a PICU. It is envisaged that a Level 2 PCCU could be referred to as a PCCU (or ward or area). It is conceivable that a term other than 'Paediatric Critical Care Unit' may be felt appropriate for smaller regional hospitals designated as Level 1 PCCUs and delivering Level 1 CC in a small one or two bedded designated area. However regardless of size and the terminology used, they should meet all standards required of a Level 1 PCCU.

It would be ideal if consistent terminology was applied within each PCC ODN and also across PCC ODNs and across the whole UK.

Recommendations

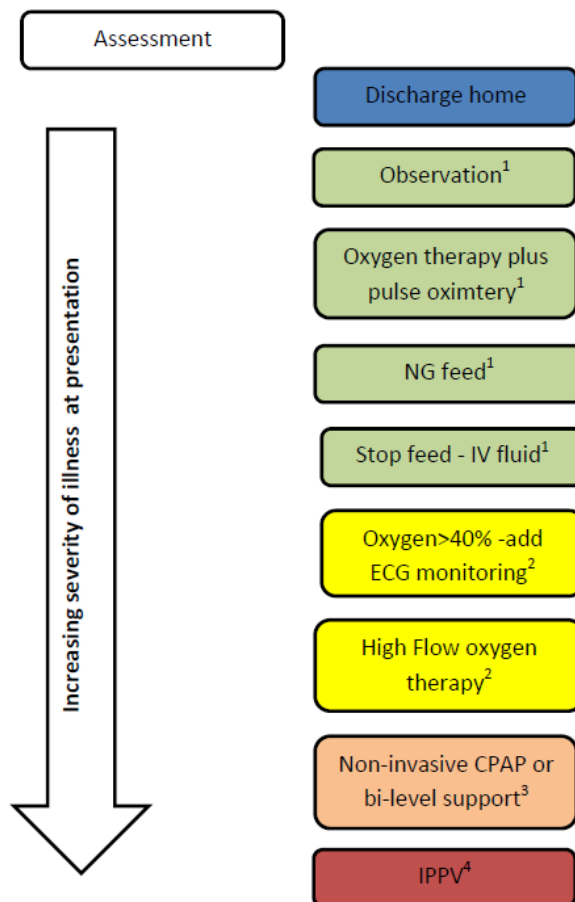
10. PCC ODNs should be established. Many of the recommendations contained in this report will not be deliverable without a PCC ODN.
11. Each PCC ODN should have responsibility and provide oversight of Level 1, 2 and 3 PCC, LTV, retrieval/transport and ECMO services within its network (and beyond where relevant).
12. Each PCC ODN, working with commissioners, should agree the designation of Level 1, Level 2 and Level 3 PCCUs within their network.
13. Each PCC ODN, working with commissioners and host providers, should be responsible for monitoring adherence to CC standards.
14. Each PCC ODN should mandate PCCMDS data collection and submission to SUS and PICANet from both Level 1 and Level 2 units within their network to allow them to monitor activity and outcomes.
15. Each PCC ODN, working with commissioners and host providers, will be responsible for the labeling or 'badging' of the PCCUs within its network, that is to say the terms to be used on the sign above the door.

5. Clinical pathways

- 5.1** Perhaps the most useful way to describe the proposals contained in this document is to use a number of clinical scenarios to highlight the key proposals. Appendix 3 contains a clinical pathway for the following common clinical scenarios requiring CC support: 1) diabetic ketoacidosis, 2) the child with reduced conscious level, 3) acute trauma, 4) status epilepticus, 5) acute asthma, 6) acute arrhythmia, 7) acute respiratory failure, 8) the child with an acute abdomen requiring urgent/emergency surgery and 9) the child who has undergone complex elective surgery.
- 5.2** Overleaf we have presented the pathway for the infant or child with acute respiratory failure. An example would be acute bronchiolitis, a common problem every winter which places considerable pressure on in-patient beds and in particular PICU beds. Within the pathway are a number of 'trigger points' which would prompt consideration of escalating care up to a higher CC level, which might also require transfer of the child to a different CC unit (Level 1 to Level 2/3, or Level 2 to Level 3).
- 5.3** Some of the trigger points within the proposed pathways may be difficult to define with any precision. Each CC ODN should be responsible for setting the trigger points to implement across their network, taking into account geographical and other considerations. At the very least the trigger should result in a discussion of the case with the network transport service and an agreed plan of how to proceed.
- 5.3.1** The trigger or escalation point from one level to the next may be set at different levels dependent on patient factors, such as age or diagnosis. For example one ODN may consider it clinically appropriate to support the delivery of low levels of nasal CPAP support (< 6 cms H₂O) for babies with acute bronchiolitis within a Level 1 PCCU rather than transfer these babies to Level 2 or Level 3 centres. They may choose to set a trigger for consideration of transfer to be a requirement for a higher level of CPAP support or a persistent CPAP requirement beyond a defined time limit.

The same ODN may not feel it appropriate for the same Level 1 unit to provide acute CPAP to an older child with asthma or pneumonia, and may recommend this be restricted to a network Level 2 unit.

- 5.3.2** The emphasis should be on local pathways being agreed through the local PCC ODN.

Bronchiolitis pathway

¹Interventions performed in all hospitals admitting children

²Level 1 (basic critical care) interventions. Can be performed in a Level 1 unit designated to undertake Level 1 interventions

³Level 2 (intermediate critical care) interventions. Can only be delivered in a Level 2 unit designated to undertake Level 2 interventions

⁴PICU – able to deliver Level 3 (advanced critical care) interventions

⁵Currently only performed at specialist centres.

5.4 Identification of a child whose clinical condition is deteriorating

We recommend that a single standardised Paediatric Early Warning Score (PEWS) or system be used across all paediatric wards and CCUs within a PCCN. Whilst there would be advantages in the same system being used across all PCCNs, that is to say in mandating a nationally agreed system for all in-patient paediatrics, we are aware that a number of systems are in use across the UK and do not feel we can recommend this at this time.

Recommendations

16. Each PCC ODN should develop clear guidelines and agree clinical pathways to ensure that patient care is coordinated and provides equity of access to PCC services.
17. This should include trigger points for discussing the case with the network transport service for potential escalation of CC support.
18. A single standardised PEWS or system, together with a consistent observation policy, should be used across all children's wards and PCCUs within a PCC ODN.

6. Transportation

- 6.1** Network PCC transport services should be responsible for providing advice, decision support, triage and if required an appropriately staffed and resourced transport team to move the critically ill child between PCCUs, whether the destination is a Level 2 or a Level 3 PCCU.
- 6.2** Most PCC transport services are not currently resourced to be able to undertake Level 2 transfers, though a number of the more complex non-PICU transfers are being undertaken already by PCC transport services, recognising the fact that a critically ill child who is not anaesthetised, intubated and ventilated may require equivalent, or even greater, expertise in order to deliver a safe transfer.
- 6.3** The same standards (staff, training, equipment) expected of teams transporting patients to a Level 3 unit (PICU) will apply to the transport of children to Level 2 units (PICS Standards 2010). Specifically someone capable of providing advanced airway support (intubation) should undertake the transfer. Given these stringent standards it is considered unlikely that teams other than existing PCC transport teams will undertake PCC transfers, other than in the situation of an emergency time-critical transfer. The recommendations for this situation are already addressed within PICS Standards (2010).

Recommendations

- 19. Existing paediatric critical care transport services, should be responsible for providing advice, decision support and triage to their CC ODN, to include children receiving Level 1 and Level 2 CC.**
- 20. A PCC transport service should be responsible for coordinating and undertaking the transfer of a child to Level 2 and Level 3 PCCUs.**
- 21. The same standards (staff, training, equipment) expected of teams transporting patients to a Level 3 unit (PICU) will apply to the transport of children to Level 2 units (PICS Standards 2010).**

7. Workforce considerations

- 7.1.1** There is broad acceptance that we need to leave behind the assumption that all nursing and medical staff will have acquired the necessary knowledge and skills to care for a critically ill child as part of their 'core' training.
- 7.1.2** A number of very important improvements have been made to nurse training in the recent past which, it is hoped, should form an excellent foundation on which to build more specific CC skills. Junior medical staff have far fewer encounters with a critically ill child than they used to, reflecting the concentration of critically ill children in fewer hospitals and ward areas and the reduction in their working/training hours over the past 10 years.
- 7.1.3** Current standards pertaining to staff training and delivery of CC to children have been heavily influenced by the need to set a standard at a level that can be met by current staffing levels and training opportunities. The requirement for all hospitals to be able to deliver HDU care and the failure to discriminate different levels of complexity of HDU care have made it difficult to consider other options until now.
- 7.1.4** The group recommendation is to set challenging targets for staff training and competence for the future, recognising at the same time the need to allow some flexibility about how to deliver these targets, and in what time frame. We do not accept the point of view that says we cannot set the bar at the appropriate level because we do not have enough middle grade doctors in training. Innovative ways of delivering equivalent care should be considered, recognising that these may not be immediately available, may involve utilising different staff groups and will need a period of transition.
- 7.1.5** The training and competence requirements need to be appropriate for the complexity of care being delivered. Therefore the level for staff working within a Level 2 unit must be set higher than that expected of staff delivering care in a Level 1 unit.
- 7.1.6** We also recognise the need to ensure that every consultant paediatrician, or consultant anaesthetist, responsible for supervising the care of children within a PCCU should have had the appropriate training in management of the critically ill child. At the same time we recognise the need to discriminate what should be required of someone going through training in 2014/15 and beyond from what can reasonably be expected of someone already in a consultant post.
- 7.1.7** Whilst the day-to-day management of children within PCCUs will usually be led by paediatricians, anaesthetists and general/adult intensivists will continue to play a vital role in multi-disciplinary teams managing the critically ill child, including those undergoing complex elective surgery. They will continue to provide expert acute airway management, being responsible for intubation and invasive ventilation as part of acute stabilisation should a child require ventilation for transfer to PICU, and together with CC outreach teams can provide advice and support to paediatricians in optimising care of the critically ill child within the regional hospital CC unit.

7.1.8 A number of PCCUs, particularly those with a focus on post-operative care, may have a model in which day-to-day management is led by consultant anaesthetists working in partnership with their paediatric colleagues. The skills and experience of both consultant and middle-grade anaesthetists fulfilling these roles should be appropriate to the tasks involved and follow the same general principles, standards and competencies described for paediatric staff, supported by appropriate Royal College-based competencies and training modules as appropriate. It will be the responsibility of the local PCC ODN to ensure that these are met.

7.1.9 Continuing Professional Development (CPD) for nurses, trainees and consultants working in CC units will need to include a focus on appropriate CC updates and other learning opportunities.

Recommendations

22. Staff working in a Level 1 PCCU should meet the relevant training competencies laid out in this document.

23. Staff working in a Level 2 PCCU should meet the relevant training competencies laid out in this document. Staff working in a specialty-specific Level 2 PCCU must also meet all of the Level 2 training competencies.

24. Staff working in Level 1 and Level 2 PCCUs should keep up to date and refresh their knowledge and skills relating to care of the critically ill child. Each member of staff should plan their CPD as part of their annual appraisal/personal development plan.

25. PCC ODNs should ensure that suitable educational and training opportunities are available for staff working in the Level 1 and Level 2 PCCUs in their network. This should include appointment of a CC nurse educator to support the network.

7.2 Nursing staff considerations

7.2.1 A full description is presented in Appendix 4.

7.2.2 The key components are:

- A framework of CC skills, with Level 2 unit skills set at a higher level to reflect the interventions being delivered and greater patient complexity.
- These skills to be acquired by staff within 12 months of working in a Level 1 or Level 2 PCCU.
- Nurses new to CC should work a minimum of 75 hours of supervised practice in a Level 1/2 CC area, to gain the essential skills required.
- Level 1 unit: there should be a minimum of one nurse on every shift, who is directly involved with caring for the critically ill child, who has successfully completed all the required PCC skills, or has completed an in house education and training programme covering similar learning outcomes.

- Level 2 unit: there should be a minimum of one nurse on every shift, who is directly involved with caring for the critically ill child, who has successfully completed a validated/accredited education and training programme of study addressing all the required PCC skills to Level 2.
- Recommendations for the learning outcomes, content and assessment are in Appendix 5. A course of study should be quality controlled and ideally Quality Assurance Accredited (QAA) for Higher Education.
- 70 % of nursing staff should hold a Qualification in Specialty (Defining Staffing Levels for Children and Young People's Services RCN, 2012). This is defined by attainment of the necessary skills and evidence of acquisition of the necessary underpinning knowledge.
- All PCCU staff should have up to date paediatric Basic Life Support (BLS) training.
- There should be a minimum of one nurse on every shift who is directly involved with caring for the critically ill child, who must have completed a recognised paediatric resuscitation course, for example PILS/PLS/EPLS/APLS (Resuscitation Council UK, 2010/ALSG, 2011) or have completed an in-house education and training programme covering similar learning outcomes.
- As per current PICS Standards (2010) and RCN Standards (2013) the recommended nurse:patient ratio for Level 1 and level 2 PCCUs should be 1:2, though this will be influenced by a number of factors, including patient diagnosis and complexity, severity of illness (PEWS score), and nursing skill-mix and seniority.

Recommendations

26. A framework of CC skills is proposed, with Level 2 unit skills set at a higher level to reflect the interventions being delivered and greater patient complexity. These skills should be acquired by staff within 12 months of working in a Level 1 or Level 2 PCCU. The recommendations apply to all PCCUs, including specialty-specific PCC areas within a tertiary children's centre.
27. Nurses new to CC should work a minimum of 75 hours of supervised practice in a Level 1/2 CC area, to gain the essential skills required.
28. Level 1 unit: there should be a minimum of one nurse on every shift, who is directly involved with caring for the critically ill child, who has successfully completed all the required PCC skills, or has completed an in-house education and training programme covering similar learning outcomes. Level 2 unit: there should be a minimum of one nurse on every shift, who is directly involved with caring for the critically ill child, who has successfully completed a validated/accredited education and training programme of study addressing all the required PCC skills to Level 2.
29. All PCCU staff should have up-to-date paediatric BLS training.
30. At least one nurse on each PCCU shift should have up to date advanced resuscitation training.
31. 70 % of nursing staff should hold a Qualification in Specialty (Defining Staffing Levels for Children and Young People's Services RCN, 2013).

32. A course of study should be quality controlled and ideally QAA for Higher Education. Course content, delivery and assessment should be consistent with the recommendations in Appendix 5.

33. The recommended nurse:patient ratio for Level 1 and Level 2 PCCUs should be 1:2, though this will be influenced by a number of factors, including patient diagnosis and complexity, severity of illness (PEWS score), and nursing skill-mix and seniority.

7.3 Medical staff considerations

The recommendations and standards relating to medical staffing and timely review of admissions contained within RCPCH's 'Facing the Future' document should be met in any PCCU. Similarly the recommendations contained in Sir Bruce Keogh's document 'Seven Day Consultant Present Care', specifically those for consultant review twice daily and for new admissions to be seen by a consultant within 14 hours of admission should be met in every Level 1 and Level 2 unit (Academy of Medical Royal Colleges, 2012).

7.3.1 Middle grade (or equivalent) staffing

7.3.1.1 A full description is presented in Appendix 6.

7.3.1.2 The key components are:

- Junior paediatricians in training have limited opportunities to encounter a critically ill child. Anecdotally some of those completing training do not feel confident in managing a critically ill child.
- There is a comprehensive competency framework from RCPCH which describes the competencies a paediatrician in training should acquire at Level 1 (ST1-3), Level 2 (ST4-5) and level 3 (ST6+) of their training, for both general and sub-specialty areas of paediatrics.
- Unfortunately within the current framework there is not separate consideration of the competency requirements relating to care of the critically ill child.
- However within the different sections of the framework there are a number of competencies which are highly relevant to delivery of Level 1 and Level 2 CC for children. Examples are given in Appendix 6. An exercise to map RCPCH competencies to CC clinical pathways and interventions has highlighted that many of the competencies required to deliver Level 1 and Level 2 CC are contained at Levels 2 and 3 in the RCPCH framework, with, not surprisingly, a significant number of the Level 2 CC competencies at Level 3 in the RCPCH framework.
- This is not consistent with the current PICS Standards (2010) which states that 24-hour cover for a HDC unit should be provided by a doctor at ST3 level or above – ST3 doctors will not have acquired all Level 2 competencies.

7.3.1.3 We recommend that:

- 24/7 middle grade (or equivalent) cover for a Level 1 unit should be provided by a paediatrician in training who has achieved all Level 1 RCPCH competencies (typically ST4 or above).

- 24/7 middle grade (or equivalent) cover for a Level 2 unit should be provided by a paediatrician in training who has achieved all Level 2 RCPCH competencies (typically ST6 or above).
 - o Recognising the limited number of ST6+ trainees who are available across a network we would emphasise the need to consider staff groups and staffing models which can deliver an equivalent level of CC cover on a 24/7 basis.
 - o Staff groups who may, with appropriate training, be able to provide equivalent expertise and relevant competencies might include Advanced Nurse Practitioners, and non-consultant non-training doctors (staff grade and specialty doctors). These staff groups may also offer a more sustainable and consistent model over time. On-call models based on 24/7 on-site paediatric consultants will also deliver the required level of cover.
 - o A doctor in training who has already completed a six-month full-time posting in a PICU should also be considered in the equivalent group, as they would be expected to have achieved the Level 2 competencies relevant to CC.
- Middle grade (or equivalent) staff must have up-to-date advanced resuscitation training (APLS, EPLS).
- The responsibility for assessing and monitoring the level of cover provided for each CC unit will rest with the Trust hosting the PCCU and the relevant PCC ODN.
- There is recognition that some of the proposed staff competency and training standards may prove challenging to achieve in the immediate term. These recommendations should be seen as developmental and a timescale for their adoption should be agreed by each PCC ODN. It is expected that all PCCUs should be compliant by 2018 and beyond.

Recommendations

34. 24/7 middle grade, or equivalent, cover for a Level 1 unit should be provided by a paediatrician in training who has achieved all Level 1 RCPCH competencies (typically ST4 or above), and has up-to-date advanced resuscitation training (APLS, EPLS).
35. 24/7 middle grade, or equivalent, cover for a Level 2 unit should be provided by a paediatrician in training who has achieved all Level 2 RCPCH competencies (typically ST6 or above), and has up-to-date advanced resuscitation training (APLS, EPLS).
36. Alternative models of providing an equivalent level of cover/competence should be considered. This might include the use of advanced nurse practitioners, specialty doctors, and doctors in training who have already completed a six-month full-time posting in a PICU. On-call models based on 24/7 on-site paediatric consultants will also deliver the required level of cover.
37. The responsibility for assessing and monitoring the level of cover provided for each PCCU should rest with the Trust hosting the PCCU and the relevant paediatric critical care ODN.

38. There is recognition that some of the proposed staff competency and training standards may prove challenging to achieve in the immediate term. These recommendations should be seen as developmental and a timescale for their adoption should be agreed by each PCC ODN. It is expected that all PCCUs should be compliant by 2018 and beyond.

39. We recommend RCPCH consider introduction of a separate section within the competency framework to describe competencies pertaining to acute illness and care of the critically ill child.

7.3.2 Consultant staffing

7.3.2.1 There is currently no expectation that every paediatrician in training will spend time training in a PCCU, whether a PICU or an 'HDU'.

7.3.2.2 This is in sharp contrast with the requirement for every paediatrician in training to complete a minimum of 12 months training in a Neonatal Intensive Care Unit.

7.3.2.3 Whilst there is broad agreement that undertaking a period of PICU within training would be desirable and provide every consultant paediatrician with useful skills in managing critical illness this is not currently mandated. Newly appointed consultant paediatricians may therefore have limited knowledge of CC.

7.3.2.4 We recommend discriminating the level of CC training and experience expected for consultant paediatricians working in hospitals with Level 1 and Level 2 PCCUs.

7.3.2.5 We recommend no significant change for those appointed to a hospital with a Level 1 PCCU. The requirement would be a Certificate of Completion of Training (CCT) in paediatrics without any specific CC training beyond that delivered as part of regular run-through training (although a period of PICU training remains highly desirable).

7.3.2.6 We recommend that those appointed as a general paediatrician and providing clinical cover for a Level 2 PCCU should have undertaken relevant training in PCC.

7.3.2.7 RCPCH has previously developed a number of special study modules (also called SPIN modules) aimed at developing general paediatricians with a particular area of interest/expertise during level 3 training (ST6+).

7.3.2.8 One of the existing SPIN competency frameworks relates to paediatric HDC for children. It was principally developed to allow a paediatrician in training wanting to play a lead role on delivery of HDU care for children to gain the required competencies. The SPIN module has to date recommended a training period of 12 months in PICU and 12 months working as a general paediatric trainee in a centre with a designated HDU for children.

7.3.2.9 We propose replacing the existing SPIN module with a modified SPIN competency framework and template to allow it to be used to ensure newly appointed consultants have

the necessary CC knowledge and skills to work in a Level 2 PCCU.

- 7.3.2.10 This modified competency framework (Appendix 7: A framework of competence for a Special Study module in PCC) requires a period of six months spent working in PICU as well as six months working in a hospital with a Level 2 PCCU. Being shorter than the original SPIN module we anticipate this should be more deliverable for a greater number of paediatricians in training.
- 7.3.2.11 We strongly recommend flexibility about when the PICU module is delivered. Whilst the goal should be for it to be delivered during run-through training if possible, it may also be delivered post-CCT, allowing trainees who have not had the opportunity to complete a PICU attachment to do so post-CCT before taking up a consultant post in a centre with a Level 2 PCCU. There are sufficient PICU fellow posts nationally to deliver this.
- 7.3.2.12 Recognising their previous experience, existing consultants working within a centre with a Level 2 PCCU are not expected to undertake additional training but should aim to use CPD opportunities to maintain and enhance their knowledge and skills relevant to CC.

Recommendations

40. We recommend discriminating the level of CC training and experience expected for consultant paediatricians working in hospitals with Level 1 and Level 2 PCCUs.
41. We recommend no significant change for those appointed to a hospital with a Level 1 PCCU ie the requirement would be a CCT in paediatrics without any specific critical care training beyond that delivered as part of regular run-through training.
42. We recommend that those providing consultant cover for a Level 2 PCCU should have undertaken relevant training in PCC and have enhanced CC competencies.
43. We recommend that the competency framework in Appendix 7 (A framework of competence for a Special Study Module in PCC) be adopted by RCPCH for this purpose.
44. We recommend that prior to taking up a consultant post in a Level 2 PCCU an individual should have completed a period of six months working in PICU as well as six months working in a hospital with a Level 2 PCCU.
45. We strongly recommend flexibility about when the PICU module is delivered. Whilst the goal should be for it to be delivered during run-through training it should also be available post-CCT, allowing those who have not had the opportunity to complete a PICU attachment to do so before taking up a consultant post in a centre with a Level 2 PCCU.
46. These recommendations should be seen as developmental and a timescale for their adoption should be agreed by each PCC ODN. It is expected that general paediatricians appointed to consultant posts in 2018 and beyond will have completed this training.

47. Existing consultants who provide cover for a Level 2 PCCU are not expected to undertake additional training but should aim to use CPD opportunities to maintain and enhance their knowledge and skills relevant to CC.

48. Where a Level 2 PCCU is anaesthesia led, the skills and experience of both consultant and middle-grade anaesthetists fulfilling these roles should be appropriate to the tasks involved and follow the same general principles, standards and competencies described for paediatric staff, supported by appropriate Royal College-based competencies and training modules as appropriate.

7.4 Maintaining competence and skills/CPD

7.4.1 It will be essential for all staff working in Level 1 and Level 2 units to keep up to date and refresh their knowledge and skills relating to care of the critically ill child. This includes medical staff (paediatric and anaesthetic) supporting the PCCU as part of their on-call commitments).

7.4.2 Suitable opportunities might include spending time in another CC unit to observe practice, undertaking further courses, and attending relevant training events and conferences. Each member of staff should plan their CPD as part of their annual appraisal/personal development plan.

7.4.3 PCC ODNs will be responsible for ensuring that suitable educational and training opportunities are available for all staff, including the broader multidisciplinary team, working in the level 1 and level 2 PCCUs in their network. This should include appointment of a CC nurse educator to support the network. In many instances this may be linked to the network retrieval/transport service.

7.4.4 Optimal care of the critically ill child in a regional hospital relies on close working across a number of disciplines, including anaesthesia, general/adult ICU and emergency medicine. Specialists from these areas will also require support for their educational and training needs, and should plan relevant CPD as part of their annual appraisal/personal development plan.

Recommendations

49. Staff working in Level 1 and Level 2 PCCUs should keep up to date and refresh their knowledge and skills relating to care of the critically ill child. Each member of staff should plan their CPD as part of their annual appraisal/personal development plan.

50. PCC ODNs should ensure that suitable educational and training opportunities are available for staff working in the Level 1 and Level 2 PCCUs in their network. This should include appointment of a CC nurse educator to support the network.

51. Anaesthetic staff, general/adult ICU and the ED team are essential components of the CC pathway and should receive support for their educational and training needs. They should also plan relevant CPD as part of their annual appraisal/personal development plan.

8. Setting standards and defining quality

- 8.1** The 2010 PICS Standards include a number of standards which relate to the critically ill child pathway outside of PICU, including a set of standards relating to HDC. These are highlighted in Appendix 8.
- 8.2** It is anticipated that the recommendations contained in this report will be used to refine the existing PICS Standards relating to HDC.
- 8.3** Ahead of the next version of the PICS Standards we have produced a draft set of standards relating to Level 1 and Level 2 CC (Appendix 8).
- 8.4** As part of the commissioning process a service specification is developed to define a clinical service, and a set of quality indicators (quality dashboard) is developed to define measures of quality that can be applied across all providers of that service. In the near future it is anticipated that a service specification and set of quality indicators will be developed for all levels of CC, delivered in Level 1, 2 and 3 units.
- 8.5** 2014/15 Service Specifications for Level 2 and Level 3 PCCUs have been produced by the PCC CRG for NHS England and are consistent with the approaches and recommendations contained in this report.
- 8.6** It will be the responsibility of the PCC ODN working closely with commissioners to ensure that the required standards are met, that the quality dashboard items are collected, and to monitor performance across all PCCUs in the ODN.

Recommendations

- 52.** The recommendations contained in this report should be used to refine the existing PICS Standards relating to HDC.
- 53.** We recommend development of a service specification and quality dashboard for CC, to include Level 1 and Level 2 care.
- 54.** The PCC ODN working closely with commissioners should ensure that the required standards are met, and that the data to inform the quality dashboard are collected.

9. Measurement of activity and outcomes

- 9.1** A robust audit process is needed to record how much CC activity is being delivered, to which patients, and where it is happening ('right child, right care, right place'). In addition the outcome of CC episodes must be measured.
- 9.2** In order to do this a national minimum dataset is needed that can capture both activity and outcomes.
- 9.3** The PCCMDS is a dataset that is already collected by all PICUs and a number of HDUs (Appendix 9). It is the nationally agreed currency for PCC to be used by PbR. Data items in the PCCMDS map to one of seven HRG levels, the first two of which relate to Basic and Intermediate CC (Level 1 and Level 2 care).
- 9.4** Since the dataset was developed by the EWG in 2005 it has become apparent that a limited number of additional items need to be added to PCCMDS to allow it to better capture and describe CC activity, particularly Basic and Intermediate CC activity.
- 9.5** The additional items which have been identified and agreed by the HRG EWG are highlighted in Appendix 9.
- 9.6** It is imperative that these items are added to PCCMDS and the HRG Grouper so that activity can be accurately measured.
- 9.7** PICANet is a collaborative project between the University of Leeds and the University of Leicester, funded by the Healthcare Quality Improvement Partnership (HQIP). PICANet collects data on every child admitted to a PICU in England, Wales, Scotland, Northern Ireland and Eire, and produces a comprehensive annual report that captures PICU activity and key outcomes including length of stay, mortality and standardised mortality (to account for illness severity).
- 9.8** At present a significant proportion of activity that occurs in PICUs is Level 1 and Level 2 CC activity. An example would be a child who is recovering from a serious illness and has been taken off the ventilator but requires a further period of close monitoring before being ready to be discharged from PICU. The proportion of PIC activity that maps to Level 1 and Level 2 CC, rather than Level 3 CC, varies considerably from unit to unit with the national average being 25.3% (range 16 to 79%) (PICANet report 2012).
- 9.9** PICANet does not currently collect activity and outcome information for children receiving Level 1 and Level 2 CC outside of a PICU but would be the most appropriate body to do so.
- 9.10** Draft data collection forms have been devised to support data capture in Level 1 and Level 2 CC units across the Wessex and South West regions (Appendix 10). The data collection includes information about any inter-hospital transfers that are required and how these are undertaken. In addition a draft data collection form has been developed through PICANet to support consistent data capture across all Trusts (Appendix 10b).

- 9.11** For logistical reasons it is proposed that initially PICANet support data collection from Level 2 units only. This will require less additional resources and will allow the process of data capture to be assessed and refined as necessary.
- 9.12** However it is anticipated that PCC ODNs will mandate data collection in both the Level 1 and Level 2 units within their network to allow them to monitor activity and outcomes.
- 9.13** PCC ODNs should take note of the outcomes defined by the Children and Young People's Health Outcomes Forum, in particular those defined through the 'acutely ill workstream', and should ensure that relevant outcome measures are collected.

Recommendations

- 55.** The remit of PICANet should be expanded to include collection of all critical care activity occurring in designated PCCUs. Funding will be required for this to happen. One option would be to add in collection of data from Level 2 PCCUs in the first instance.
- 56.** Each PCC ODN should coordinate the collection of CC activity across all hospitals in the network (Level 1, 2 and 3 PCCUs).
- 57.** Each PCC ODN should audit all CC activity that occurs within its network.

10. Audit and governance arrangements

- 10.1** Each PCC ODN should develop a robust governance structure and monitor performance across all PCCUs in the network.

It must ensure that all providers in the network support a) delivery of care and access to treatment in line with local and nationally agreed protocols, b) training and audit requirements of the network, and c) critical incident reporting across the network.

- 10.2** This will capture multiple domains. A description of the network responsibilities is given in Appendix 2.

- 10.3** Each Trust with a PCCU will be responsible for meeting the required CC standards and relevant service specification as described in Appendix 8 and 11 and the most recent version of PICS Standards for Care of the Critically Ill Child (2010).

- 10.4** The governance responsibility for the delivery of safe, high-quality CC services across the network should lie principally with the individual service providers, supported by the LAT and the host of the PCC ODN. Each ODN must have a mechanism in place to address any clinical governance issues that impact on the network with an appropriate escalation plan.

In the event of a significant governance issue the usual escalation framework for an individual provider should apply, with, dependent of severity, involvement of the Trust Governance team and Executive team, CCG CEO or LAT Director of Commissioning, LAT Director, and CQC and/or Monitor. In parallel the host of the PCC ODN and the PCC ODN Clinical Director should be notified.

- 10.5** Each PCC ODN will be expected to produce an annual report that describes the activity and outcomes of all children meeting CC criteria. They will host educational and training events for staff working in the network and hold an annual meeting to share the performance of the network with all stakeholders and discuss network strategic direction.

Recommendations

58. Each PCC ODN should develop a robust governance structure and monitor performance across all PCCUs in the network. It must ensure that all providers in the network support a) delivery of care and access to treatment in line with local and nationally agreed protocols, b) training and audit requirements of the network, and c) critical incident reporting across the network.
59. The host of the PCC ODN, together with the LAT, will have responsibility for ensuring the effective functioning of the network, including Level 1 and Level 2 CC units in the network.
60. Each PCC ODN should publish an annual report that describes the activity and outcomes of all children meeting critical care criteria.
61. Each PCC ODN should host educational and training events for staff working in the network and hold an annual meeting to share the performance of the network with all stakeholders and discuss network strategic direction.
62. Each Trust with a PCCU will be responsible for meeting the required critical care standards as described in the most recent version of PICS Standards for Care of the Critically Ill Child.
63. Each Trust with a PCCU will be responsible for meeting the required service specification as described by the PCC CRG and for submitting data required by the quality dashboard.
64. The governance responsibility for the delivery of safe, high-quality CC services across the network should lie principally with the individual service providers, supported by the LAT and the host of the PCC ODN.

11. Commissioning arrangements and designation of Critical Care (CC) units

- 11.1** Children looked after on children's wards who meet HDC HRG criteria consume 2.5 to 3.0 times the medical and nursing staff resource compared to other children on the ward. It is therefore appropriate and important that funding follows this activity.
- 11.2** Historically commissioning and funding of high dependency activity has differed dependent on where the activity has been delivered.
- 11.3** HDC activity undertaken within PICU has been commissioned by Specialised Commissioning Teams (SCT, now NHS England) and in many cases has been paid at a bed-day rate of around £1,700-£2,000, identical to what has been paid for a PICU bed-day.
- 11.4** The same activity undertaken on a children's ward would previously fall under the responsibility of the Primary Care Trust (now CCGs) and not have separate funding. In theory the core HRG funding for the hospital spell would contain an up-lift to reflect the fact that some patients within that HRG might require enhanced or high dependency care.
- 11.5** In one or two geographical locations across the UK some HDC activity taking place in designated HDUs has been commissioned and funded, usually through the SCT (NHS England) rather than the PCT (CCG).
- 11.6** Importantly the uneven playing field created by this complex arrangement of commissioning and funding HDC for children has held back progress with agreeing and implementing clinical pathways.
- 11.7** In addition PICU clinical networks have concentrated their efforts around PIC activity as opposed to CC activity happening outside of PICU, reflecting a failure to establish formal managed clinical networks for PCC (in contrast to those established for adult and neonatal CC).
- 11.8** There is an opportunity under the new commissioning structures and arrangements to rectify this and bring in sensible joined-up commissioning of all CC activity for children. This would then allow recognition and relevant resources to go to CC activity, regardless of whether it is undertaken in a PICU or within a Level 1 or Level 2 PCCU.
- 11.9** Logically NHS England, which is responsible for all specialised services, should have oversight of all PCC activity. This would be analogous to the current situation for neonatal CC.
- 11.10** Work has already started to capture all CC activity under one commissioning umbrella, with new service specifications for PIC, retrieval/transport and ECMO going live from April 2013. Draft service specifications for Level 2 CC and for LTV have been produced with the expectation that these will be added in due course. At present the 'HDC' service specification is restricted to consideration of Level 2 PCC units. Appendix 11 contains a draft service specification for both Level 1 and Level 2 PCCUs which incorporates the key recommendations of this report.

- 11.11** PCC ODNs should be established, in line with those for adult and neonatal CC services. Each ODN should be responsible, along with the LAT commissioners, for designating Level 1 and 2 PCCUs in their network.
- 11.12** PCC is currently still funded on a block contract model in virtually all areas of the UK but is likely to be funded through a PbR tariff system in the coming years, whether in full or in part. This will allow differential funding for different levels of CC complexity which is lacking at present.
- 11.13** Current commissioning fails to differentiate different levels of CC that are being delivered in PICU, typically paying the same 'tariff' for a basic CC HRG (Level 1 care) and for an advanced level 5 HRG (Level 3 care).
- 11.14** As described above currently funding is largely confined to PICU (Level 3 unit) activity, creating a concern about where funding to support Level 1 and 2 units will come from. It is most unlikely that new money will be available.
- 11.15** It is likely that funding will need to be 'extracted' from other areas. Examples might include funding released through a reduced tariff paid for Level 1 and Level 2 activity occurring in PICUs compared to the current 'PICU bed-day rate', and release of funding from within core HRGs which may have included an element of funding to support enhanced care.
- 11.16** It should be emphasised that transfer of some Level 1 and Level 2 CC activity away from PICUs to Level 1 and Level 2 PCCUs would represent better use of resources and be cost effective.
- 11.17** Data from PICANet identifies around 25,000 bed-days of Level 1 and Level 2 activity (based on HRGs) undertaken in 25 PICUs across England in 2012. This equates to a median of 27.5% of total PICU activity in each unit (mean 33%) (range 16.0 to 91.5%).
- 11.18** Development of more robust Level 1 and Level 2 PCCUs should allow a proportion of this activity to be undertaken outside of PICUs, releasing valuable PIC capacity. Modeling based on a reduction to 20% of PIC activity being Level 1 and Level 2 activity suggests that around 8,000 PICU bed-days could be released per year in England. Delivery of an even higher proportion of activity in Level 1 and Level 2 PCCUs, such that only 15% of total PICU bed-day activity maps to Level 1 and Level 2 care, would release in excess of 12,100 PICU bed-days each year. This would equate to an additional 33 PICU bed-days available each day of the year across England.
- 11.19** Given the increased demand on PIC capacity that occurs year on year, at approximately 5% growth per year, transfer of this activity out of PICUs would result in a system more resilient to cope with the surge each winter and restrict the requirement for increased PIC bed commissioning year on year.
- 11.20** It is not sensible to continue to pay ~£2,000 a day for PIC activity that could be delivered at a lower cost in a different setting, for example care of the infant requiring CPAP for bronchiolitis. Increased delivery of care in designated Level 2 PCCUs would potentially i)

prevent PIC admissions, ii) accelerate PIC discharges, iii) prevent closure of ward beds to accommodate a 'high intensity' patient and iv) often deliver care closer to home.

- 11.21** Based on the above modeling and assuming a payment of ~£1,000 per day for Level 1 and Level 2 CC activity, delivery of 8,000 to 12,100 bed-days in Level 1 and Level 2 PCCUs rather than in PICUs would release between ~£8 million to ~£12.1 million per year which could be invested in delivering CC activity outside of PICUs.
- 11.22** Further funds could be released by earlier discharge of a number of long-stay patients from PICU to a Level 2 unit. Across the UK only 2.2% of PICU admissions are long-stay patients (> 28 days in PICU) but they consume 22% of total PICU capacity (bed-days).
- 11.23** Further funds could be released by earlier discharge of long-term tracheostomy ventilated patients from PICU to a Level 2 unit. Within PICU these patients currently map to an advanced CC HRG (Level 3 care) rather than to basic (Level 1) or intermediate (Level 2) HRGs, and attract a full PICU tariff.
- 11.24** Not all long-stay PICU patients or LTV patients could be cared for in a Level 2 unit. However we estimate that around half of long-stay PICU activity could be cared for outside of PICU. Release of ~10% of total PIC activity would equate to another 10,550 PICU bed-days per year in England at a cost of ~£21.1m per year. Assuming a payment of ~£1,000 per day for this activity if undertaken within a Level 2 unit, delivery of 10,550 bed-days in Level 2 PCCUs rather than in PICUs would release around ~£10.5m of additional savings.
- 11.25** The precise details and the corresponding tariff structure will need to be worked out by the PbR team/Monitor but the principle of a single funding model for all CC activity is felt to be important.
- 11.26** In the first instance it may be deemed prudent to concentrate on establishing the commissioning arrangements and funding model for Level 2 PCCUs, but the intention should be to deliver one structure and model that will capture Level 1, 2 and 3 PCCUs.
- 11.27** Should CCGs and NHS England remain responsible for commissioning different components of the CC pathway it would be helpful if one body, most logically NHS England, had responsibility for oversight of the whole pathway.

Recommendations

- 65. We recommend that the commissioning of all PCC activity should be hosted by one agency to avoid the commissioning disconnects of the past. We recommend that this be NHS England rather than CCGs.**
- 66. Should CCGs and NHS England remain responsible for commissioning different components of the critical care pathway it would be helpful if one agency had oversight of the whole pathway, most logically NHS England.**
- 67. A service specification and quality dashboard should be developed and refined for Level 1 and Level 2 PCCUs and should be implemented as soon as possible.**
- 68. Every designated PCCU should collect the PCCMDS and return their activity through the SUS.**
- 69. Every designated PCCU should return Reference Costs for Basic, Intermediate and Advanced CC HRGs on an annual basis.**

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List of appendices

- Appendix 1:** Historical variation in models of high dependency care delivery within a region, using acute CPAP therapy in bronchiolitis as an example
- Appendix 2:** Network roles and responsibilities
- Appendix 3:** Clinical pathways and case vignettes
- Appendix 4:** Critical care skills for children's nurses working in Level 1 and Level 2 paediatric critical care units
- Appendix 5:** Critical care programme for nurses caring for children in Level 1 and Level 2 PCCUs
- Appendix 6:** Medical staff recommendations
- Appendix 7:** A framework of competence for a Special Study Module in Paediatric Critical Care (RCPCH)
- Appendix 8:** Draft revised standards for paediatric critical care units
- Appendix 9:** The Paediatric Critical Care Minimum Dataset (PCCMDS) and mapping to HDC HRGs
- Appendix 10:** Example PCCMDS data collection forms for critical care units
- Appendix 11:** Service specification for Paediatric Critical Care
- Appendix 12:** Abbreviations
- Appendix 13:** List of recommendations, together with suggested timescales for implementation
- Appendix 14:** PCCU equipment

Download the appendices from the RCPCH website: www.rcpch.ac.uk/high-dependency-care



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