LRI Emergency Department and Children's Hospital

LRI Children's Emergency Department Standard Operating Procedure (SOP) for Critical Care Pathway for Children & Young People (< 16 years)

Staff relevant to:	All Staff involved in the receipt, assessment, recognition, stabilisation and management of the critically unwell child as part of the single front door for children at UHL.
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Original Authors: Reviewed by:	**Dr S Jones, Dr G Lewis, Dr M Duthie, Dr B Cagney, Dr C Wighton, Dr D Roland** **V 4.1 Revised by P Barry** **V 4.3 Revised by E Dekker, C Westrope and D Roland** **V 4.4, 4.5, 4.6 Revised by D Roland** **V 5.0 Revised by D Roland, J Tong and S Bandi**
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Key Points:

- In the event of a **cardiac arrest** or **trauma call**, this SOP should **not** be used.
- These patients should be managed in **Resus**.
- **Senior Involvement** should occur early
- The **CAT Senior** will determine if the child needs Children's Intensive Care input and will contact the CICU Team directly.
- **Consultant to Consultant** discussion may occur and any subsequent Consultant agreed management plan supersedes this SOP.

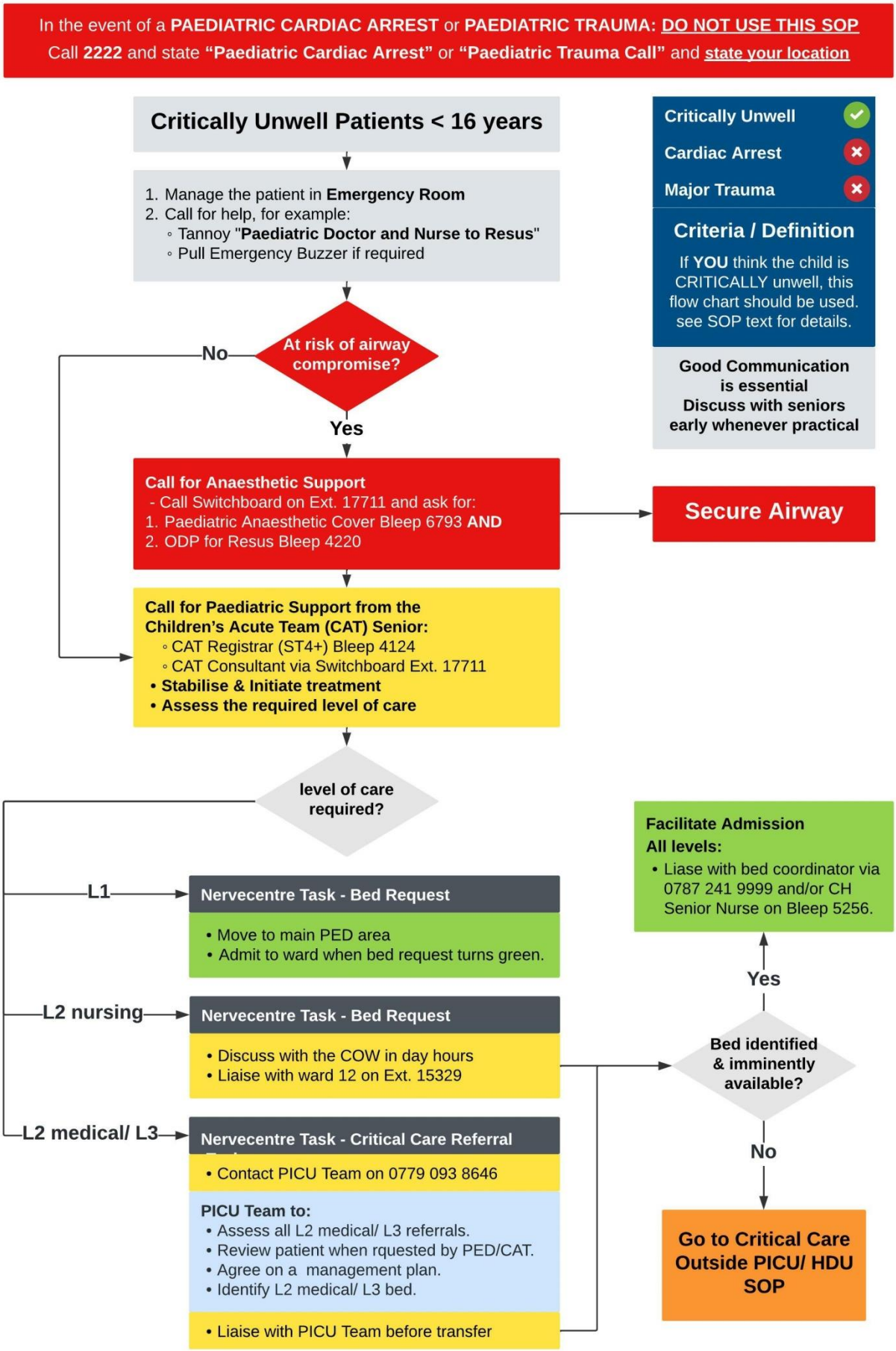
1. Introduction and who this SOP applies to

The term critically ill child often means different things to different people and is relative to an individual's level of experience and skill. One broad definition might be **"children requiring, or potentially requiring, high dependency or intensive care whether medically, surgically or trauma- related."**

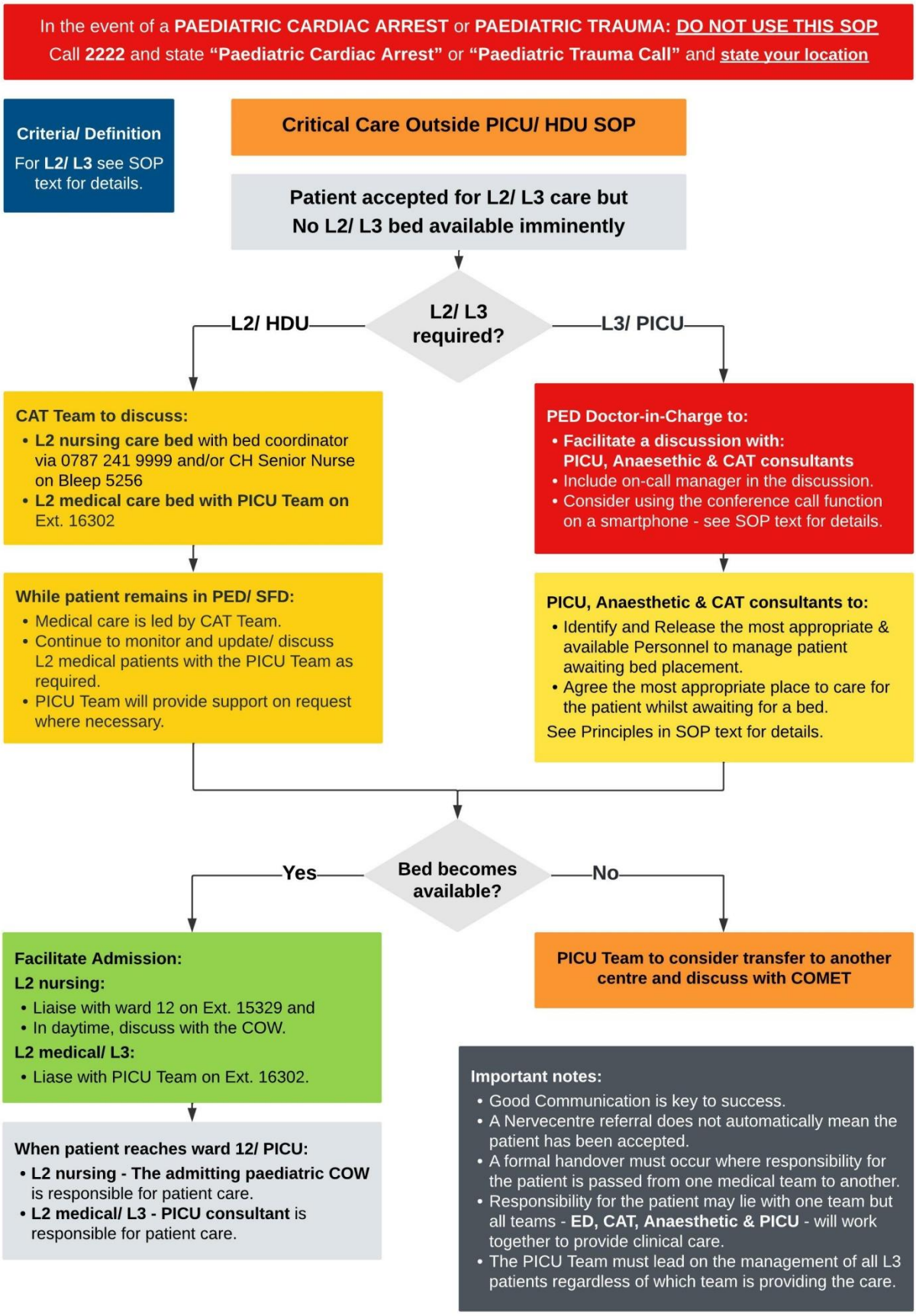
The management of critically unwell children arriving at the UHL Emergency Department requires the co-operation of Emergency Department, Paediatric Anaesthetic, Paediatric Intensive Care and General Paediatric personnel.

It is recognised that while all teams face challenges in terms of inflow, outflow, acuity, staffing and skill mix, early recognition and resuscitation of critically unwell children is paramount to prevent deterioration and/or arrest, from which recovery remains unlikely in children.

Flow chart 1: Immediate management of critically unwell patient



Flow chart 2: Critical Care Outside PICU/HDU



2. Principles

2.1 All services are busy. The ED Consultant needs to be available to manage newly arriving undifferentiated patients, the CAT team will be managing newly admitted patients, the PICU Consultant will be managing cardiovascularly unstable patients and the Anaesthetic Team will be needed in theatre. No one service is any more or less available than another to provide care. It is important regardless of perception of work intensity and ability to provide assistance that all parties participate in a conference call should it be required.

2.2 If it is likely a bed on CICU will be available but not imminently (i.e within 30 minutes; the trust standard for referral disposition) Use the Critical Care Outside PICU / HDU SOP (flowchart above) thought must be given to (i) who can safely manage the child for this period and (ii) where would be the best physical location to care for the child

2.3 Most modern smart phones have the ability to conference call multiple people. Make a call, use the "add call" function followed by the "merge call" function (iPhone). It will be helpful to note down the phone numbers for the PICU, Anaesthetic, and CAT Teams in advance.
In exceptional circumstances where this is not possible, the COMET call handing service may be used. Call 0300 300 0023, say "I would like to activate the Critical care Outside PICU SOP and set up a conference call.". The respective phone numbers have to be prepared in advance and submitted to the COMET call handler. Note that this process may take some time to set up.

2.4 Responsibility for a patient can only be passed from one medical team to another through a formal handover. Make sure the new team understands that they have taken over responsibility.

2.5 If no bed is available, or likely to be available, an early decision on if the patient needs transfer should be made.

2.6 If COMET are unable to transfer within a reasonable timeframe, then a decision needs to be made on the "least-worst approach" to ensuring the child's airway and medical needs are managed safely. Two possible approaches are:

a. Transfer to a bed on CICU with no assigned CICU nurse. For this to occur nursing staff will need to be released from other areas and acknowledges that this nurse will be supported by the CICU team in managing the airway and ventilation. The SILVER command nurse may be able to assist with discussions regarding this.

b. To have a prolonged stay in the ED. In this case the ongoing airway management must be provided by appropriately trained staff equivalent to care provided by being in either Theatre, CICU or on a transfer.

2.7 It is likely that 2.2 – 2.6 may result in challenging and difficult discussions given the over-arching first principle. It is important discussions take place with this context in mind. If no agreement can be reached the senior manager-on-call and potentially director on call will be needed to enable consensus to be reached.

3. Definitions of Critical care:

There is a trend away from using "ICU" and "HDU" terminology to define the level of paediatric critical care required for a patient, toward simpler terms that do not imply a particular unit or area (Level 1 and Level 2 critical care would previously be described as HDU care):

Level 1 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.

Level 2 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 Care and activities that should only be undertaken within PICUs due to complexity or level of critical illness

Further information on paediatric critical care provision is available here

Note that a child may need to move up and down between critical care levels at any point of their clinical journey and reassessment will be required based on clinical need.

The following is a rough guide to interventions mapped to critical care levels based on RCPCH and Paediatric Critical Care Society standards adapted for UHL. It is important to note that the circumstances of each individual patient should be considered when making decisions on the most appropriate level of care. For example, co-morbidity or multiple interventions may increase the threshold for a higher level of care. The pathway also refers to Level 2 Nursing and Level 2 medical care. This is a UHL description to acknowledge that not all patients who require enhanced nursing care necessarily also need critical care medical input. If in doubt, discuss with the PICU Team.

Level 1:	Continuous ECG monitoring + Oxygen therapy + continuous pulse oximetry
	Upper airway obstruction requiring 2- 4 hourly nebulised adrenaline.
	Stable chronically reduced conscious level (GCS 12 or below)
	DKA requiring continuous insulin infusion
Level 2:	Nasopharyngeal airway
	Acute Non-invasive ventilation / CPAP
	Recurrent Apnoea causing desaturation or needing stimulation
	Tracheostomy after the first tube change
	Stable long-term ventilation
	Acute Severe Asthma requiring intravenous bronchodilator infusion or Requiring more frequent than 2 hourly Nebulisers (A single Magnesium bolus is **NOT** an indication for L2/HDU care)
	40 - 80 ml/kg volume boluses in < 24 hours
	Seizures requiring continuous anti-convulsant infusion (no respiratory depression)
	Acute reduced conscious level (GCS 12 or below) and hourly or more frequent GCS monitoring
	DKA requiring hourly or more frequent obs / blood glucose
	Requiring hourly or more frequent observations
	Epidural catheter following surgery
	Exchange transfusion
	Thrombolysis (tPA, streptokinase)
	Specifically for Level 2 care on ward 1:
	Arrhythmia requiring IV anti-arrhythmic therapy
	A stable child requiring milrinone or prostaglandin infusion

	Temporary pacing via secure implanted wires (external pacing through defibrillator pads should be cared for on PICU)
Level 3:	Invasive Mechanical Ventilation or Acute Non-invasive ventilation / CPAP
	New tracheostomy up to the first trachy tube change
	CPR in past 24 hours
	Vasoactive infusions
	>80 ml/kg fluid boluses in 24 hours
	Advanced monitoring e.g. Arterial / CVP / Cardiac Output / ICP monitoring
	Haemofiltration / Haemodialysis / Peritoneal dialysis / Plasma filtration
	ECMO / Intra-aortic balloon pump
	Seizures requiring continuous anti-convulsant infusion (with respiratory depression)
	DKA with pH <7.1 / severe dehydration with shock / suspected cerebral oedema

4. Standards and Procedures

This SOP was devised by representatives of the aforementioned groups, to ensure the child has access to the appropriate care in the most timely manner.

4.1. Arrival and identification

Patients may be brought by ambulance or may self-present. In the latter case, early identification of serious illness and transfer to resus is essential.

4.2. Critically Unwell Criteria

Possible personnel involved in the care of these patients have differing levels of expertise. This SOP should be used once the individual with primary responsibility for the patient perceives the patient to be critically unwell and in need of an enhanced level of care. **Early involvement of senior staff is essential.**

4.3. Airway compromise

If there is any suspicion of impending airway compromise, paediatric anaesthetic support is required and appropriately skilled personnel are to be contacted **first** (see flow chart).

4.4. Referral

If airway is safe, referral should be made to the Children's Acute Team (CAT) Registrar as the first point of contact, because:

a. a single point of contact streamlines communication
b. they have a good overview of Children's Hospital status
c. they are likely to have comparable acute skills to the Intensive Care Registrar
d. the CICU team, by definition, have the sickest inpatients, and are less available to attend ED with minimal warning.

4.5. Level of care and location of care

The ED, CAT, Anaesthetic and CICU teams, where involved, will establish the level of ongoing care required, and work together with the children's hospital to determine the best onward location and facilitate safe transfer.

The underlying principle is that all services are busy and that a universal compromise will need to be reached in determing the needs of the patient. No one service has greater challenges than another.

5. Education and Training

None

6. Monitoring Compliance

What will be measured to monitor compliance	How will compliance be monitored	Monitoring Lead	Frequency	Reporting arrangements
Datix reporting of adverse incidents	Datix review process	ED OpG COTW	Weekly	Via Governance review
Monthly analysis of paediatric HDU/ITU admissions	Data	G Lewis	Monthly	CED Critically Careful Forum
Analysis of performance against SOP standards at monthly Paediatric ITU/Anaesthetic/ED meetings.	Cases flagged to ED/Anaes/ICU meeting	G Lewis / D Roland	Monthly	To ED/Anaes/ICU meeting

7. Supporting References

High Dependency Care for Children - Time To Move On. A focus on the critically ill child pathway beyond the Paediatric Intensive Care Unit. RCPCH publications

https://www.rcpch.ac.uk/sites/default/files/2018-07/high_dependency_care_for_children_-_time_to_move_on.pdf

The Paediatric Critical Care Society Quality Care Standards 6th Edition, Oct 2021

https://pccsociety.uk/old-news/pccs-publishes-6th-edition-quality-care-standards/

8. Key Words

Critically unwell child, referral, admission, Level 1, Level 2, Level 3, COMET

The Trust recognises the diversity of the local community it serves. Our aim therefore is to provide a safe environment free from discrimination and treat all individuals fairly with dignity and appropriately according to their needs.
As part of its development, this policy and its impact on equality have been reviewed and no detriment was identified.

CONTACT AND REVIEW DETAILS	
Document Lead (Name and Title) Dr. Damian Roland, Childrens Emergency Department Consultant	**Executive Lead** Chief Medical Officer
Details of Changes made during review: Re-drawn flow chart and updated terminology for single front door Added new definitions and incorporated RCPCH guidance on levels of care Changed process when no bed is available References updated	