

Guidelines for Paediatric Patient in CCTC

The current health care crisis has impacted Paediatric Critical Care. With significantly less bed capacity (66 PCCU beds for the Province of Ontario), the high admission rate due to Respiratory Syncytial Virus (RSV) has strained the system and impacted all Paediatric patients requiring ICU access.

Critical Care Services Ontario has asked all Adult ICUs to support their Paediatric colleagues and the Paediatric population by accepting patients who are 14 years of age and older. The request is to provide care to teenagers with medical diagnosis that are consistent with our Adult Critical Care population. By accepting even a few patients that are within our scope of practice, capacity can be freed up in Paediatric ICUs to care for patients with unique or complex Paediatric disorders.

Although caring for children is outside most Adult care providers comfort level, children age 14 and above are cared for the same as Adults. Additionally, children admitted to CCTC will have medical conditions familiar to our health care providers; the treatment plan for these conditions in children is the same as in Adults. In the event that we admit a very small adolescent (less than 40 kg), a customized plan will be developed upon admission.

Children are on occasion admitted to University Hospital; having Paediatrics within our walls, with PCCU across the hall, provides a unique level of support in CCTC that is not available in other Adult centres.

Anticipated Admission Criteria: Age 14+

MRP: CCTC Consultant

Consultation:

PCCU Consultant/PCCOT. PCCU team makes suggest orders to be reviewed/approved by CCTC (same as per current practice in both CCTC and PCCU).

PCCOT:

Will round daily to answer questions and ensure staff are comfortable. For the management of complex situations that are outside usual care expectations, PCCOT can be called at 15555 or page the PCCU Fellow/Consultant.

Admission and Transfer:

Admissions should be reviewed Consultant to Consultant and Charge Nurse to Charge Nurse to determine which critical care unit is in the best position to take the next Paediatric admission. Consultant to Consultant communication should be made at point of transfer from CCTC.

Daily touch points between PCCU AND CCTC Consultants and Nursing Leadership (Manager/Charge Nurse) will be made to determine ongoing care needs and transfer from CCTC. Decisions will be made on a case-by-case basis with consideration to patient care needs, anticipated duration of critical care services and staffing situations.

Transfer Process:

- CCTC MRP determines patient’s readiness for transfer
- CCTC provider contacts the receiving unit (Paediatric Resident Pager 17722) and enters order to transfer patient
- Unit Clerk notifies Admitting for bed
- PCCOT is paged to write transfer orders and leave them in a PLANNED state
- Orders are initiated upon transfer

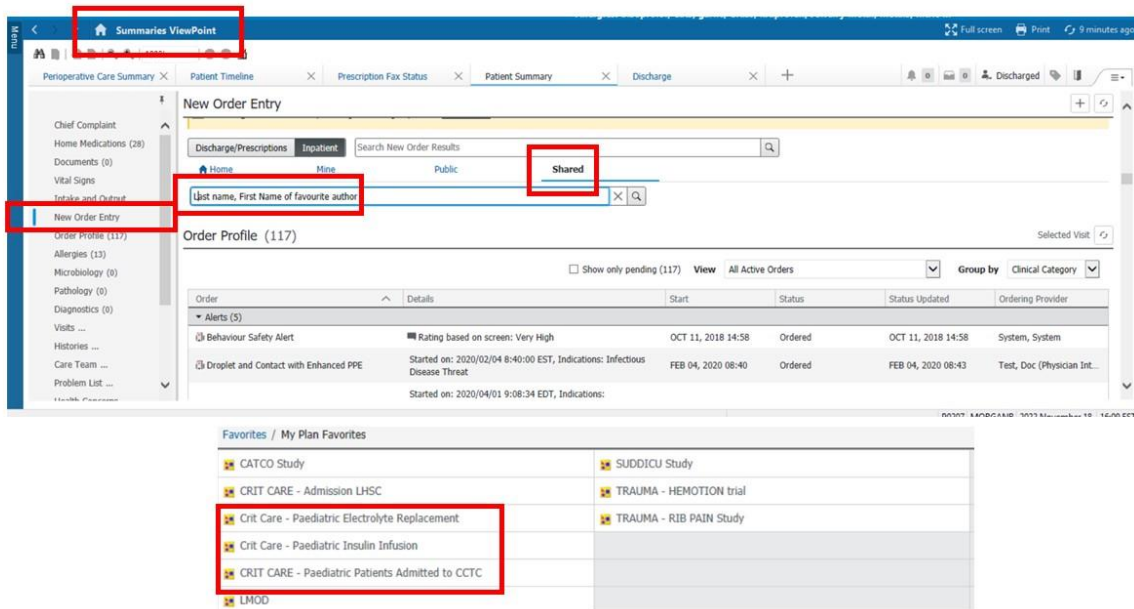
General Care Provision and Main Differences:

The care of patients who are 14 years of age or older is the same as for Adults. Most common laboratory tests are also the same.

Order Crit Care Paediatric Patients Admitted to CCTC, Crit Care Paediatric Electrolyte Replacement and Crit Care Paediatric Insulin Infusion (for non-diabetic patients). DVT prophylaxis is contained within the admission order set and should be selected with the same indications, contraindications and sequential compression stockings option as for Adult patients. These 3 order sets can be found under Lynne’s favourites.

Here is how to order favourites.

Paediatric Power Plans for Use In Adult Critical Care



Here are the major differences between Adult and Adolescent Care:

- Propofol administration should not exceed 6 to 12 hours or 5 mg/kg/hr in children due to a risk for propofol syndrome. can be used for intubation/short-term sedation. See information under Sedation.
- Intensive Insulin Therapy (non-diabetic critically ill patient) is used more conservatively in Paediatrics with close attention to preventing hypoglycemia. Blood glucose targets are 6-12 mmol/L with Intensive Insulin Therapy delayed until at least 2 blood glucose values above 12 mmol/L. before starting insulin. See information under Insulin.
- Potassium dosing is capped at 20 mmol/100 ml bolus dose and phosphate is not routinely replaced. See electrolyte replacement below.
- Psychosocial development and dependence upon parents require consideration in care planning. See below.

Medication Dosing:

Drug doses should be capped once a child reaches Adult dosing. For the majority of medications, this will happen between 40-50 kg. Call pharmacy for assistance if uncertain or if a child is under 40 kg (a customized plan will be developed).

For titratable medication, adjust based on symptoms the same as you would for Adults (e.g., to pain or sedation scores or to achieve mechanical ventilation goals).

ACLS:

Initiate BCLS as per Adult protocols and Call a Code Pink: 55555. ACLS interventions will be ordered and lead by CCTC provider (not covered by Adult Delegated Medical Acts). Code pink will be activated for consultation.

BCLS: Initiate BCLS, notify CCTC provider STAT and call a Code Pink. Prepare for defibrillation and medication administration as you would for an Adult patient.

ACLS Dosing and Guidelines for: Follow same medication doses and frequency and defibrillation guidelines as per Adult ACLS.

Antibiotics

All antibiotics require adjustment in renal impairment except ceftriaxone (just like Adults). Initiate loading dose as required; consult pharmacy to provide guidance for subsequent dosing. For children 40kg and over, the following antibiotics are all dosed the same as Adults:

- **Pip-Tazo** 4.5g q6h for all indications
- **Ceftriaxone** 2g daily for *non-meningitis*
- **Ceftriaxone** 2g q12h for *meningitis*
- **Cefazolin** 1-2g q8h

Imipenem is avoided in children because it lowers seizure threshold. Meropenem is our carbapenem of choice for children and is dosed as follows:

- Over 50 kg: 1 g q8h for ***non-meningitis***
- Over 50 kg: 2 g q8h for ***meningitis***
- Under 50 kg: 20 mg/kg/dose q8h for ***non-meningitis***
- Under 50 kg: 40 mg/kg/dose q8h for ***meningitis***

Vancomycin is dosed a bit differently in children:

- Initiate at 15 mg/kg/dose q6h to a maximum starting dose of 1g q6h, then adjust based on levels

Consult pharmacy for ongoing antimicrobial guidance (or questions about any other medications).

Sedation and Analgesia:

Use Adult dosing for opioids, benzos and dexmedetomidine. Beyond these doses, adjust based on pain and sedation scales and ventilator requirements the same as with Adults. Although some children may require high doses of sedatives and narcotics, this should not be the expectation. Monitor for pain, agitation and delirium using Adult Pain, VAMAAS and Delirium tools.

Propofol:

Should only be used for 6-12 hours; an “exit strategy” for propofol should be used based on expectations for early extubation versus prolonged ventilation. If continued sedation is required, propofol should be off within 24 hours. Do not exceed 5 mg/kg/hr. Monitor for propofol syndrome (monitor lactate, cardiovascular findings, triglycerides) during administration.

Midazolam infusion or Dexmedetomidine:

Used equally as the sedatives of choice for continuous sedation. There is a study currently where children are randomly assigned to midazolam or dexmedetomidine; currently they are considered equivalent options.

Like Adults, initiate dexmedetomidine without a bolus to reduce the chance of side-effects.

Ketamine: Can be used in children when indicated. Use Adult dosing.

Insulin:

Use a more conservative approach to glycemic control in non-diabetic children (do not use Crit Care Intensive Insulin Protocol). Avoid hypoglycemia. Start only if patient has 2 or more

consecutive glucose values > 12 mmol/L. Order Crit Care Paediatric Insulin Infusion order set (Lynne's Favourites), for non-diabetic patients. This provides orders for the following:

Start insulin at 1 unit per hour (regardless of weight); target blood glucose 6-12 mmol/L. Adjust up or down by 0.5 units per hour. Notify the provider if glucose is greater than 12 mmol/L or less than 8 mmol/L, or if the blood glucose falls by more than 4 mmol in one hour.

Hypoglycemia:

Treat with the same protocol used in Adults (as with Adults, treat whether on insulin or not).

Use Adult Hypoglycemia Medical Directive:

- Do not wait for a laboratory confirmation result to be reported before treating a low POC glucose; treat a low blood glucose STAT
- For any blood glucose reading of 2.5-3 mmol/L, administer 12.5 grams dextrose (25 ml of 50% Dextrose) IV STAT
- For any blood glucose reading of less than 2.5 mmol/L, administer 25 grams dextrose (50 ml of 50% Dextrose) IV STAT
- Recheck POC glucose every 20-30 minutes and repeat dextrose bolus as indicated above until blood glucose is greater than 4 mmol/L

Intravenous Fluid:

Order fluid as you would for an Adult.

The same goal exists in children; maintain euvolemia and avoid over resuscitation/fluid overload.

Electrolyte Protocol:

A modified Crit Care Paediatric Electrolyte Protocol is being developed. Currently, you can order as a saved favourite (under Lynne). The difference is a more conservative potassium protocol with no replacement for phosphate. Phosphate replacement is not usually required in Paediatrics and there is very little evidence to guide replacement rates.

Magnesium and calcium replacement orders are the same as Adults. If potassium is less than 3.2 mmol/L replacement is 20 mmol PO or 20 mmol/100 ml IV solution. A dose of 10 mmol is used for potassium of 3.2 to 3.5 mmol/L.

DVT:

Same indications and contraindications as for Adults after puberty (low risk before puberty).

Over 50 kg: Dalteparin 5000 units daily

40-50 kg: Dalteparin 2500 units daily for children 40-50 kg

Over 120 kg: Consider 7500 units daily (as per Adult dosing)

GI Prophylaxis:

Follow Adult guidelines and dosing. Same risks/benefits, relative contraindications and medications.

OTHER CARE PROTOCOLS:

Respiratory Support:

Invasive ventilation strategies are the same as Adult ventilation:

Routine Ventilation: 6-8 mL/kg, pH >7.30, SpO₂ >92% unless otherwise indicated, PEEP as per routine PEEP/FiO₂ table or optimal PEEP setting

ARDS Ventilation: 4-6 mL/kg, pH >7.20, SpO₂ > 88%, ARDS PEEP as per ARDS PEEP/FiO₂ table or optimal PEEP setting

Proning: for refractory hypoxemia (P/F ratio < 150)

Non-Invasive Support: initiated/treated the same as in the Adult NIV

Heated High Flow Oxygen Therapy: initiated/titrated the same as in Adult HHFO

Lines and Tubes:

- PIVs are more common. Same indications for central line as Adult.
- IJ or femoral central venous lines are used; subclavian is infrequent.
- Endotracheal tubes usually 6-7.5 mm; intubation and ventilation practices are the same
- NG 14-18 F (depending upon size)
- Foley 14 to 16 F

Feeding Tubes:

Follow feeding and feeding tube insertion protocols for Adults. Maxeran and Erythromycin single dose can be used to advance feeding tubes. Review with PCCU if patient is not tolerating feeds. Gastric residuals are not routinely checked.

Massive Hemorrhage Protocol:

Follow Adult protocol. Same dose for blood products and Tranexamic Acid for children 14 years or older and greater than 40 kg.

Status Epilepticus:

The biggest difference in managing Status Epilepticus is the limits to propofol use. High dose benzodiazepines (midazolam infusion) are used instead of propofol.

Phenytoin and levetiracetam are both used in Paediatrics the same as in Adults; levetiracetam is used more frequently because of a better safety profile. If a patient has refractory seizures, contact PCCU or Paediatric Neurology for guidance.

Psychosocial Support

1. Parents are not visitors; they can be with their child 24-7 which includes during rounds, overnight or for procedures. If we have a reclining chair available to allow one parent to sleep in the room, try to facilitate this. If neither parent can be present (may need to care for other children), they can delegate an alternate to stay with their child (e.g. grandparent or close friend).
2. Out-of-town families may qualify for Ronald McDonald House; contact Social Work for assistance.
3. Upon admission, page the Social Worker in PCCU/Paediatric Emergency on Pager 15744 (they work weekends). If you do not get a reply, contact Bev Lewis. Bev will work with the PCCU/PED Social Workers to ensure coverage on a case-by-case basis who will follow
4. Parents are part of the care team and will need daily medical updates that can be provided while rounding. Consistency from a Fellow or Consultant is the idea.
5. Child Life will support children in CCTC.