Algorithm: Ongoing Management of Pediatric Asthma Exacerbations (Page 1 of 3)

ONGOING Management

- 4 hours or more after initial systemic steroid and PRAM less than or equal to 7
- Intended to only be used for patients aged 1 to 16.99 years with an uncomplicated primary diagnosis of asthma, on room air or low-flow oxygen (not on high-flow nasal cannula)

Refer to: Provincial Pediatric Asthma Guideline for detailed instructions on intervention and care.
See Medication Reference Table below (p.3) for doses and list of abbreviations

Start timing for reassessment and next dose when medication administration **starts** (1st puff/nebulization begins)

ASSESS PRAM SCORE AND VITAL SIGNS WITHIN 30 MINUTES OF TRANSITION TO ONGOING MANAGEMENT
Consider starting inhaled corticosteroids (if admitted)
Oxygen to keep SpO_2 92% or above

MILD: Score 0 to 3

- Salbutamol 1 dose q 2 hours
- Reassess vital signs and PRAM in 1 hour:
  - **PRAM 0 to 3:** continue mild management below
  - **PRAM 4 to 7** or **8 to 12**: move to moderate or severe management and notify MRP

MILD: Score 0 to 3

- Salbutamol 1 dose q 2 to 4 hours
- Reassess vital signs and PRAM q 2 hours:
  - **PRAM 0 to 3:** continue current management
  - **PRAM 4 to 7** or **8 to 12:** move to moderate or severe manager and notify MRP
- When PRAM remains mild 4 hours after last salbutamol dose, move below

MILD: Score 0 to 3

- Wean puffs of salbutamol administered (follow health authority/agency guidelines for weaning dose; i.e. MRP/RN/RRT scope of practice)
- MRP to consider discharge

MODERATE: Score 4 to 7

- Salbutamol 1 dose q 1 to 2 hours
- Reassess vital signs and PRAM q 30 to 60 minutes:
  - **MILD 0 to 3:** move to start of mild management
  - **MODERATE 4 to 7:** continue current management
  - **SEVERE 8 to 12:** move to severe management
- Repeat PO/IV steroid dose if last administered more than 24 hours prior
- If moderate PRAM unchanged x 6 hours:
  - Move to severe management

SEVERE: Score 8 to 12

- Notify MRP immediately
- Follow Severe Asthma Management (p. 2)

Signs of impending respiratory failure:
decreased level of consciousness, agitation, cyanosis, decreased respiratory effort, confusion

Discharge Criteria

PRAM score 3 or less **AND** the following:

1. No evidence of respiratory distress
2. Good air entry, with at most, mild expiratory wheeze
3. SpO_2 92% or greater on room air;
   - If admitted: SpO_2 92% or greater for 12 hours on room air (including a documented SpO_2 92% or greater while asleep)
4. No expected need for bronchodilators more than q 4 hours
5. Asthma education completed utilizing an Asthma Discharge Checklist; including observation of MDI/spacer technique

Provide Before Discharge

- ❑ Discharge mediation prescription for reliever, controller ICS and spacer with mask/mouthpiece (and oral steroid for moderate/severe PRAM score on presentation if full course not completed during acute admission)
- ❑ Completed/updated Asthma Action Plan and provide/complete Asthma Wallet Card
- ❑ Recommend follow up with appropriate practitioner within 7 days
- ❑ Refer to pediatrician or Asthma Clinic if available for follow up

Algorithm: Ongoing Management of Pediatric Asthma Exacerbations (Page 2 of 3)

Start timing for reassessment and next dose when medication administration **starts** (1st puff/nebulization begins)

Refer to: Provincial Pediatric Asthma Guideline for detailed instructions on intervention and care.

See Medication Reference Table below (p.3) for doses and list of abbreviations

Signs of Impending Respiratory Failure

- **Decreased level of consciousness**
- **Agitation**
- **Cyanosis**
- **Decreased respiratory effort**
- **Confusion**

SEVERE: Score 8 to 12

- Inhaled salbutamol MDI with spacer or nebulizer q 20 minutes (x 3 total doses)
  - If salbutamol q 20 minutes x 3 already provided, administer continuous nebulized salbutamol
- Establish vascular access
- If not already provided, administer:
  - MethylPREDNISolone IV, even if PO steroid already provided
- Continuous SpO_2, heart rate and respiratory rate monitoring
- MRP at bedside, consult RRT (if available)
- Consider early respiratory support and magnesium sulfate infusion (see below for further recommendations)
- Consult local pediatrician on-call; if no pediatrician call CHARLiE via ZOOM/phone and a higher level of care center via PTN
- Rural/remote sites consider/prepare transfer to higher level of care

REASSESS PRAM SCORE 1 HOUR AFTER INITIATING TREATMENT

MILD: Score 0 to 3 or **MODERATE:** Score 4 to 7

Reassess vital signs and PRAM q 30 minutes x 2 (salbutamol x 1 dose q 30 to 60 minutes); then

Move to **MILD** or **MODERATE** management (page 1)

SEVERE: Score 8 to 12

- Begin of maintain continuous administration of nebulized salbutamol
- If not already provided, adminster:
  - MethylPREDNISolone IV (even if PO steroid already provided)
  - Magnesium sulfate IV (following appropriate health authority/agency guidelines) Monitor BP q 5 minutes during infusion, then q 30 minutes
- If signs of circulatory compromise, provide isotonic 10 to 20 mL/kg bolus (max 1L) over 10-20 minutes to achieve adequate perfusion (monitor for fluid overload)
- Continuous SpO_2, heart rate and respiratory rate monitoring
- BiPAP is the first-line recommendation for non-invasive respiratory support for patients with severe work of breathing and/or impending respiratory failure (BCCH/VGH PICU can support)

⚠ Caution using HFNC: see considerations for potential use of HFNC in 'Oxygen and Respiratory Support' section of guideline

- Consult local pediatrician on-call; if no pediatrician call CHARLiE via ZOOM/phone and PICU/higher level of care center via PTN
- Consider intubation with PICU consult in patient with impending respiratory failure despite maximum therapy

Consider:

- CXR
- Blood gas (venous, capillary or arterial)
- Electrolytes, CBC & Differential
- POC blood glucose
- Possibility of a pneumothorax
- Anesthesia consult for airway management

REASSESS PRAM SCORE EVERY 15 MINUTES OR AS DIRECTED

MILD: Score 0 to 3 or **MODERATE:** Score 4 to 7

Reassess vital signs and PRAM q 30 minutes x 2 (salbutamol x 1 dose q 30 to 60 minutes); then

Move to **MILD** or **MODERATE** management (page 1)

SEVERE: Score 8 to 12

- Continuous administration of nebulized salbutamol
- Early consultation with BCCH/VGH PICU via PTN for all patients with:
- Impending respiratory failure
  - Those who fail to improve following initial management
  - In patients for whom transfer to a higher level of care is anticipated
- Continue assessments q 15 minutes or as otherwise directed

Algorithm: Ongoing Management of Pediatric Asthma Exacerbations Medication References
(Page 3 of 3)

Bronchodilators

salbutamol (intermittent)	**Child weight less than 20 kg:** 5 puffs via MDI with spacer (100 mcg/ puff); or 2.5 mg via nebulizer **Child weight greater than or equal to 20 kg:** 10 puffs via MDI with spacer (100 mcg/puff); or 5 mg via nebulizer
salbutamol (weaned dose)* ***ONLY** when sustained PRAM score 3 or less with salbutamol q4h*	2-4 puffs via MDI with spacer (100mcg/puff) q4h **Follow site specific policies/procedures for weaning dose (i.e. MRP/RN/RRT scope of practice).*
salbutamol (continuous)	20 mg/hr via nebulizer

***Note:** administering nebulized medication through a HFNC circuit will dramatically reduce delivered dose. See guideline for detailed instruction*

Systemic Steroids

dexamethasone	0.6 mg/kg/dose (max 16 mg/dose) PO x 1 dose *Second dose to be given after 24 hours in hospital if scoring moderate or severe PRAM*
prednisone/prednisolone	1 mg/kg/dose (max 60 mg/dose) PO daily (x 5 days)
methylPREDNISolone	1 mg/kg/dose (max 60 mg/dose) IV q6h

Inhaled Corticosteroids (continue home maintenance therapy if applicable)

beclomethasone diproprionate HFA	100 mcg/dose inhaled BID
fluticasone propionate MDI	125 mcg/dose inhaled BID
ciclesonide MDI	200 mcg/dose inhaled once daily
budesonide DPI	200 mcg/dose inhaled BID
fluticasone propionate DPI	100 mcg/dose inhaled BID

Other

magnesium sulfate	50 mg/kg/dose (max 2000 mg/dose) IV x 1 dose **over 20 minutes**
0.9% NaCl/Ringer's Lactate bolus	10-20 mL/kg bolus (max 1L) **over 10-20 minutes**

LIST OF ABBREVIATIONS

BCCH/VGH PICU = BC Children's Hospital/Victoria General Hospital Pediatric Intensive Care Unit
BiPAP = Bilevel positive airway pressure
BP = Blood Pressure
CBC = Complete Blood Count
CHARLiE = Child Health Advice in Real-time Electronically
CXR = Chest X-Rav
DPI = Dry Powder Inhaler
HFNC = High Flow Nasal Cannula
ICS = Inhaled Corticosteroid
IV = Intravenous
MDI = Metered Dose Inhaler
MRP = Most Responsible Practitioner
O_2 = Oxygen
PRAM = Pediatric Respiratory Assessment Measure
PO = Per mouth
POC = Point of Care
PRN = as needed (Pro Re Nata)
PTN = Patient Transfer Network
q = Every
RR = Respiratory Rate
RRT= Registered Respiratory Therapist
SpO_2 = Oxygen Saturation