Alberta Acute Childhood Asthma Pathway: Evidence based* recommendations 1

For Emergency / Urgent Care

AT TRIAGE

1 Should the child be placed into the Pathway?

Inclusion

- Children ≥ 1 year and ≤ 18 years of age who present with wheezing and respiratory distress, and have been diagnosed by a physician to have asthma or have been treated prior to this episode with a bronchodilator for wheezing.**

Exclusion

- Children diagnosed with bronchiolitis
  (i.e. children < 1 yr of age who present with their first known episode of wheeze)
- Children diagnosed with upper airway obstruction
  (i.e. children with respiratory distress who have inspiratory stridor)

**While children ≥ 1 year of age with their first known episode of wheeze should not be routinely treated as part of the pathway, treating physicians may choose to include these children in the pathway.

2 Assessment at Triage

- Determine PRAM score (see chart at right), assess RR, HR, BP, T, O_2 Sat on Room Air, and LOC

3

- Initiate Treatment based on severity as determined by PRAM Score

Asthma Clinical Score (PRAM)♣

Mild, Moderate, Severe or Impending Respiratory Failure

Chalut D, Ducharme F, Davis G - J Pediatrics 2000;137:762-768

Ducharme FM, Chalut D, Plotnick L, et al. - J Pediatrics 2008;152:476-80

♣modified to adjust for higher altitude

Signs	0	1	2	3
Suprasternal Indrawing	absent		present	
Scalene retractions	absent		present	
Wheezing	absent	expiratory only	inspiratory and expiratory	audible without stethoscope/silent chest with minimal air entry
Air entry	normal	decreased at bases	widespread decrease	absent/minimal
Oxygen saturation on room air	≥ 94%	90% - 93%	≤ 89%	

Severity Classification	PRAM CLINICAL Score
Mild	0 - 4
Moderate	5 - 8
Severe	9 - 12
Impending Respiratory Failure	Regardless of score, presence of: lethargy, cyanosis, decreasing respiratory effort, and/or rising pCO_2

Abbreviations

BP – Blood Pressure; **CBG/ABG/VBG** – Capillary or Arterial or Venous Blood Gas; **CH EDs** – Children's Hospital Emergency Departments; **DPI** – Dry Powder Inhaler; **CXR** – Chest Radiograph; **ED** – Emergency Department; **ETT** – Endotracheal Tube; **HR** – Heart Rate; **ICS** – Inhaled Corticosteroid; **ICU** – Intensive Care Unit (**PICU** – Pediatric ICU); **IM** – Intramuscular; **IO** – Intraosseous; **IV** – Intravenous; **LOC** – Level of Consciousness; **MDI** – Metered Dose Inhaler; **PO** – "orally"; **PRN** – "when needed"; **RSI** – Rapid Sequence Induction; **RR** – Respiratory Rate; **T** – Temperature; **UCC** – Urgent Care Centre; **URTI** – Upper Respiratory Tract Infection; **VS** – Vital Signs

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Alberta Acute Childhood Asthma Pathway: Evidence based* recommendations 4

For Emergency / Urgent Care

DOSING IN ED/UCC

Mild, Moderate or Severe

Acute Care Medications

Aerosolized Salbutamol

- Salbutamol
- Via MDI/Spacer: 5 puffs if < 20 kg or 10 puffs if ≥ 20 kg per inhalation

MD/Spacer is preferred over Nebulizer therapy except for those with an O2 Sat < 88% on room air or PRAM ≥ 9

- Via Nebulizer: 2.5 mg if < 20 kgs or 5 mg if ≥ 20 kgs per treatment

Aerosolized Anticholinergic

- Ipratropium
- Via MDI/Spacer: 4 puffs per inhalation

MD/Spacer is preferred over Nebulizer therapy except for those with an O2 Sat < 88% on room air or PRAM ≥ 9

- Via Nebulizer: 250 mcg per treatment
- Can mix with salbutamol

Oral Corticosteroids

- Dexamethasone
- Use parenteral solution
- 0.30 mg/kg per dose, max dose 10 mg
- Causes less vomiting than prednisone/prednisolone
- Prednisone/Prednisolone
- 2 mg/kg per dose, max dose 60 mg

Intravenous Corticosteroids

- Use oral corticosteroids unless patient is vomiting or is in impending respiratory failure
- Methylprednisolone 2 mg/kg, max dose 80 mg
- Hydrocortisone 8 mg/kg, max dose 400 mg

Magnesium Sulphate

- Administer 40 mg/kg IV bolus over 20 minutes (max dose 2 grams)

Use only in severe asthma unresponsive to aerosolized bronchodilators

Intravenous Salbutamol

- Mix 25 ml of salbutamol 1 mg/ml in 25 ml of normal saline, to produce 500 mcg/ml dilution
- Infusion: start at 1 mcg/kg/min, titrate upwards as clinically needed.

Do not exceed 5 mcg/kg/min. Doses above 2 mcg/kg/min require close monitoring of HR, diastolic pressure and serum lactate, especially in older patients.

Epinephrine

- IM 0.01 ml/kg of **1/1,000**, max dose 0.5 ml

Use only in impending respiratory failure

DOSING AT DISCHARGE

Mild, Moderate or Severe

Aerosolized β2 Agonist

- Frequency
- Administer q4 hours for 12 hours then PRN
- Salbutamol (Ventolin MDI or Diskus, Airomir DPI)
- Via MDI/Spacer: **2 puffs** per inhalation treatment
- Via DPI: **1 puff** per inhalation treatment
- Terbutaline (Bricanyl Turbuhalers)
- Via DPI: **1 puff** per inhalation treatment

DPI are preferred over MDI/Spacer in children > 5 years of age

Oral Corticosteroids ① See notes at right

- Prednisone/Prednisolone 2 mg/kg, max dose 60 mg PO daily for 5 days
- Dexamethasone 0.3 mg/kg, max dose 10 mg PO daily for 2-5 days

Some pharmacies do not stock dexamethasone

Aerosolized Corticosteroids ② See notes at right

- Inhaled corticosteroids until assessed by primary physician.
- Recommended doses are:
- Beclomethasone MDI/Spacer (Qvar): 100 mcg/puff, 2 puffs BID
- Budesonide DPI (Pulmicort): 200 mcg/puff, 2 puffs BID
- Fluticasone DPI (Flovent): 100 mcg/puff, 2 puffs BID
- Fluticasone MDI/Spacer (Flovent): 125 mcg/puff, 2 puffs BID ③ See notes at right
- Ciclesonide MDI/Spacer (Alvesco): 200 mcg/puff, 1 puff BID
- Mometasone DPI (Asmanex): 220 mcg/puff, 1 puff BID

DPI are preferred over MDI/Spacer in children > 5 years of age

Device Recommendations

- 0-4 years: MDI/Spacer with mask
- ≥ 4 years: MDI/Spacer with mouthpiece
- ≥ 6 years: DPI preferred

Impending Respiratory Failure

Detailed recommendations regarding management of impending repiratory failure can be found online at:
www.pedsrespfailure.ca

Notes

① **Use in all children with moderate to severe asthma.** Consider giving in mild asthma if: frequent ED visits, or indications of recent poor control such as frequent salbutamol use.

② Inhaled steroids are recommended at discharge for **a)** all children ≥ 6 yrs and adolescents with asthma, and **b)** all children < 6 yrs with persistent wheeze. For children < 6 yrs with intermittent wheeze associated with URTIs, consider inhaled steroids at discharge if the child has frequent wheezy reoccurrences (q3 months), ED visit or hospitalization in last 12 months, prior ICU admission, or indications of recent poor control such as frequent salbutamol use.

③ Caution should be exercised when using all inhaled corticosteroids at higher doses because they pose a risk for significant adverse effects such as adrenal axis suppression or inhibition of growth (see online pathway for details*).

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Alberta Acute Childhood Asthma Pathway: Evidence based* recommendations 2

For Emergency / Urgent Care

MILD

(Score 0-4)

- VS initially and at discharge
- consider supplemental O_2
- **inhaled salbutamol x 1-2 via MDI/Spacer**
- **consider oral steroids** ① See Page 4
- CXR infrequently necessary

Discharge if:
- clinical score ≤ 3

Discharge Medications / Follow-up
- inhaled β_2 Agonists PRN
- inhaled steroids ② See Page 4
- provide short-term management plan
- recommend follow-up with community physician 3-7 days
- refer to highest level of asthma education available
- antibiotic use discouraged

See Page 4 for dosing in ED/UCC and at discharge

MODERATE

(Score 5-8)

- VS initially, q1 hour and at discharge
- keep O_2 Sat ≥ 95%
- **inhaled salbutamol and ipratropium x 3 within 60 minutes via MDI/Spacer**
- **oral steroids after first aerosol treatment**
- CXR infrequently necessary
- In Regional / Rural Centres, consider Pediatrics consult if available

Reassess following therapy

Score ≤ 3
- observe 1 hour after last inhaled salbutamol; consider discharge if continued score ≤ 3

Discharge Medications / Follow-up
- inhaled β_2 Agonist q4 hours x 12 hours - then PRN
- inhaled steroids ② See Page 4
- oral steroids
- provide short-term management plan
- recommend follow-up with community physician 3-7 days
- refer to highest level of asthma education available
- antibiotic use discouraged

Score > 3
(and < 4 hours after administration of oral steroids)
- inhaled salbutamol q30-60 minutes

Reassess q30-60 minutes

Score > 3
(and ≥ 4 hours after administration of oral steroids)

Admit to hospital

See Page 4 for dosing in ED/UCC and at discharge

Abbreviations

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Alberta Acute Childhood Asthma Pathway: Evidence based* recommendations 3

For Emergency / Urgent Care

SEVERE

(Score 9-12)

- VS q20 minutes until improved
- keep O_2 Sat ≥ 95%, consider 100% O_2
- **continuous nebulized salbutamol and ipratropium via nebulizer**
- **oral steroids after first aerosol treatment**
- consider IV access and fluids
- **In Rural Centres contact RAAPID or Pediatrics if available**
- **In Regional Centres, consult Pediatrics**

Reassess following therapy

Score ≤ 3
- observe 1 hour after last salbutamol; consider discharge if continued score ≤ 3

Discharge Medications / Follow-up
- inhaled β_2 Agonist q4 hours x 12 hours - then PRN
- inhaled steroids ② See Page 4
- oral steroids
- provide short-term management plan
- recommend follow-up with community physician 3-7 days
- refer to highest level of asthma education available
- antibiotic use discouraged

Score > 3 and < 9
(and < 4 hours after administration of oral steroids)
- inhaled salbutamol q30-60 minutes

Reassess q30-60 minutes

Score > 3
(and ≥ 4 hours after administration of oral steroids)

Admit to hospital

Score ≥ 9
- continuous nebulized salbutamol
- initiate IV access and fluids
- consider CXR
- if at CH EDs or Regional Centre, start IV magnesium sulphate
- **any other ED/UCC, contact RAAPID**

Reassess following therapy

Continued severe symptoms (Score ≥ 9)
- continuous nebulized salbutamol
- if at CH EDs or Regional Centre, contact PICU (RAAPID) and start IV salbutamol
- obtain CBG/ABG/VBG

See Page 4 for dosing in ED/UCC and at discharge

IMPENDING RESPIRATORY FAILURE

- 100% O_2 via nebulizer @ 8-10 liters per minute.
- continuous nebulized salbutamol and ipratropium via nebulizer.
- cardiopulmonary monitor.
- consider IM epinephrine.
- insert 2 IVs; if no access consider IO.
- give IV/IO/IM steroids.
- **call RAAPID and talk to the Pediatric Intensivist on call.**
- get most experienced help available.
- rule out pneumothorax clinically, or by CXR if time allows.
- consider IV magnesium sulphate.
- start at 1 mcg/kg/min of salbutamol IV.
- **if no improvement, consider intubation.**
- give 20 ml/kg normal saline fluid bolus.
- RSI with atropine, ketamine and succinylcholine.
- place cuffed ETT.
- ventilate with low tidal volumes (4 ml/kg).
- maintain sedation and paralysis.
- rule out barotrauma (CXR).
- obtain CBG/ABG/VBG.

DO NOT INTUBATE ROUTINELY

See Page 4 for list of drugs, dosing, and detailed outline of management

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