



Paediatric Emergency Department Asthma Clinical Pathway

Information Package September 2014

Background

Following a teen's death from asthma in 2000, the province moved to develop the Ontario Asthma Plan of Action (APA) "to reduce mortality, morbidity and health care costs . . . through integrated initiatives focused on health promotion and prevention, management and treatment, and research and surveillance."^{1,2} One of the APA initiatives is the Emergency Department Asthma Care Pathways (EDACP), a standardized approach to the urgent treatment of asthma. The Lung Health Foundation has been leading this initiative since 2007.

The EDACP and its implementation tools have been designed to support best practice and to address key objectives of asthma management that can lead to improved asthma care delivery and patient outcomes in the emergency department (ED). Use of clinical pathways may improve quality of care by promoting adherence to clinical guidelines, reducing variation in treatment, and improving communication with patients and between members of the health care team.³

The Lung Health Foundation assembled an inter-professional Steering Committee to oversee the development, dissemination and implementation of the EDACP. An interdisciplinary Expert Content Working Group (ECWG) reviewed Canadian Thoracic Society (CTS) and international asthma guidelines, other relevant published literature, and examples of previously developed pathways with the goal of creating comprehensive clinical pathways. Key priorities identified to guide deliberations included: assessment of exacerbation severity; evidence-based treatment; patient education prior to discharge; comprehensive discharge instructions; and, follow-up arrangements.

An Adult Emergency Department Asthma Care Pathway (A-EDACP) for ages 16 years and older was developed first. A pilot study⁴ undertaken in 2006 demonstrated that pathway use increased referrals for follow-up care and improved patient recollection of teaching done in the ED without a substantial increase in length of stay; there was also increased documentation of objective measures such as peak expiratory flow (PEF) and the use of systemic corticosteroids in the ED and on discharge. Dissemination of the A-EDACP commenced in late 2008. Incorporating new evidence and feedback from clinical users, an updated A-EDACP was released in March 2013. Lessons learned from the provincial implementation guided development of a Pediatric Emergency Department Asthma Clinical Pathway (P-EDACP) for ages 1 to 17 years, which began in late 2009. Pilot implementation of the P-EDACP at Cambridge Memorial Hospital was undertaken between November 2012 and April 2013.

¹Young JG. Verdict explanation. In: Chief Coroner, Province of Ontario. Inquest touching the death of Joshua Fleuelling. Jury verdict and recommendations. Sept–Nov, 2000 (Toronto).

² Ontario Asthma Plan of Action <http://www.health.gov.on.ca/en/pro/programs/cdpm/asthma.aspx>

³ Allen D, Gillen E, Rixson L. Systematic review of the effectiveness of integrated care pathways: what works, for whom, in which circumstances? *Int J Evid Based Healthc*. 2009 Jun;7(2):61-74. doi: 10.1111/j.1744-1609.2009.00127.x.

⁴ Loughheed MD, Olajos-Clow J, Szpiro K, Moyses P, Julien B, Wang M, Day AG, Ontario Respiratory Outcomes Research Network. Multicentre evaluation of an emergency department asthma care pathway for adults. *CMEJ* 2009;11(3):215-29.

Funded by the Government of Ontario within the APA, the EDACP is available at no cost to Ontario health care professionals and facilities for non-commercial use. The pathway tools can be accessed electronically through the Lung Health Foundation website: <https://hcp.lunghealth.ca/clinical-programs/>. Hospitals are permitted to adapt the formatting of EDACP tools to suit their site's requirements for order sets, including adding logos.

Description: P-EDACP

Inclusion Criteria

The P-EDACP is for patients aged 1 to 17 years presenting with wheeze and/or cough who have a history of asthma and/or prior history of wheezing. The patient must also be assessed using the Paediatric Respiratory Assessment Measure (PRAM) score, a validated measure based on 5 clinical signs: suprasternal retractions, scalene muscle retractions, air entry, wheezing, and oxygen saturation.⁵ The PRAM score assists clinicians to determine the asthma exacerbation severity level: mild, moderate, severe, or impending respiratory failure – the latter being informed by clinical presentation rather than a specific PRAM score.⁶

Pathway Tools

A comprehensive algorithm guides specific treatment in each severity level, the escalation of treatment if the patient's condition worsens, and when to consider discharge.

Additional tools include medication guidelines and pre-printed physician's orders (PPO) for each of the four severity levels, a patient education checklist, and discharge instructions with integrated prescription. To address treatment delays noted during the A-EDACP implementation, an optional medical directive was developed to authorize administration of bronchodilators and systemic corticosteroids prior to physician assessment. A pocket reference guide and small poster will also be available to support implementation.

The discharge instructions are an adaptation, with permission, of a similar tool in use at the Children's Hospital of Eastern Ontario (CHEO). This tool includes instructions based on the stop-light coloured zones of control depicted in many asthma action plans, along with information about asthma triggers and a quick asthma control quiz.

During pilot implementation, there was a request for a documentation tool to record PRAM scores and medication administration. As each hospital will have its own standards for medication and vital sign documentation, the expert group decided not to create a PRAM documentation tool as part of the pathway; however, examples of such documentation records from CHEO, Montreal Children's Hospital, and a combined version will be made available, which may guide individual hospitals in creating their own documentation tools.

⁵ Ducharme, F., Chalut, D., Plotnick, L., Savdie, C., Kudirka, D., Zhang, X., et al. (2008). The Pediatric Respiratory Assessment Measure: A Valid Clinical Score for Assessing Acute Asthma Severity from Toddlers to Teenagers. *The Journal of Pediatrics*, 152 (4), 476-480.e1.

⁶ *ibid*

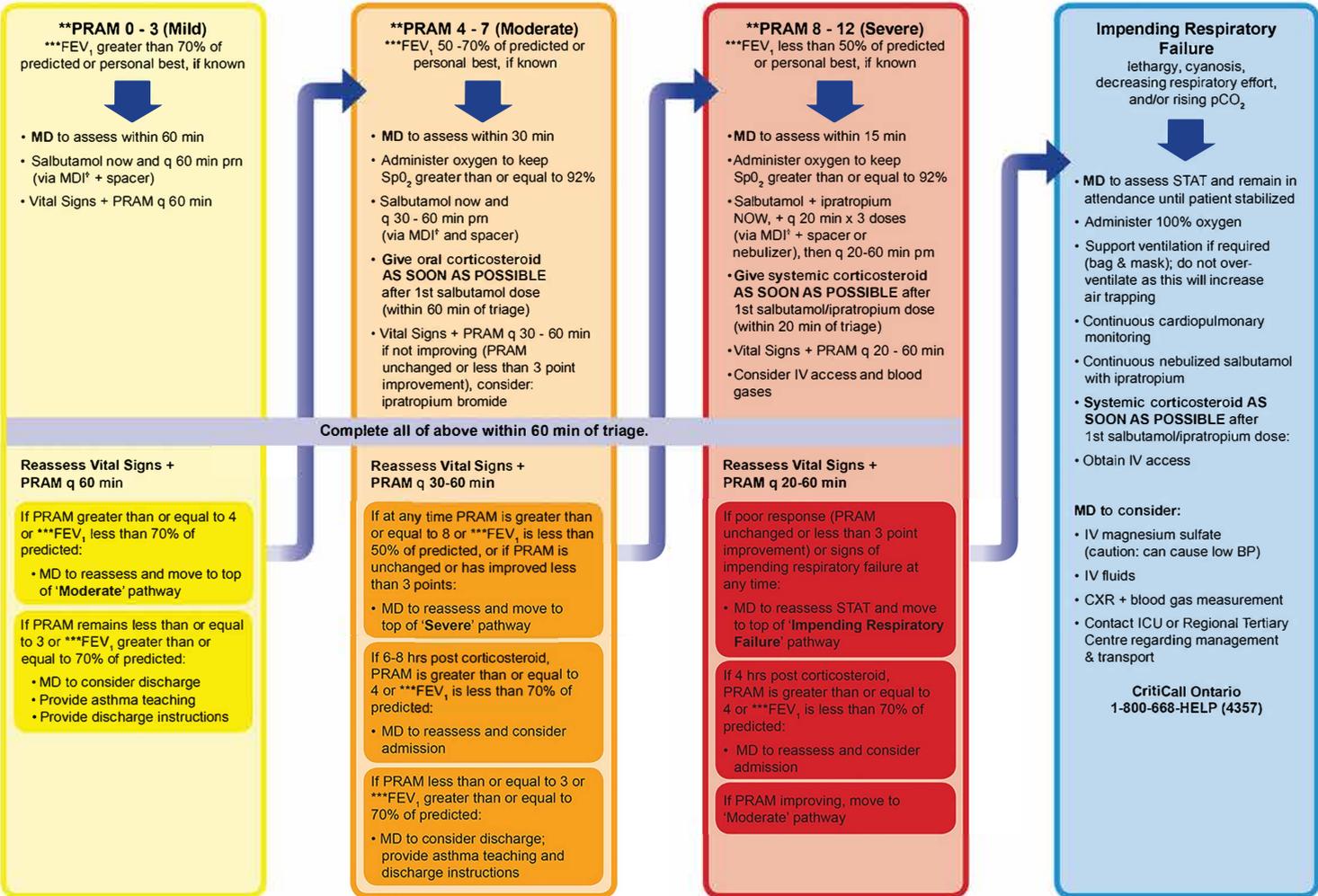
Paediatric Asthma Clinical Pathway

Indications to start Paediatric Asthma Clinical Pathway

- Age 1-17 years with wheeze and/or cough
- AND
- asthma diagnosis and/or past history of wheeze

Physician assessment required prior to starting on clinical pathway if:

- any active chronic condition other than asthma OR
- prior serious adverse reaction to salbutamol, ipratropium bromide, or oral corticosteroids OR
- active chickenpox or suspected incubation of chickenpox OR
- heart rate greater than or equal to 200 beats/min



¹Inhaled medication delivery by metered dose inhaler (MDI) and age appropriate valved spacer is preferred unless continuous oxygen is required. Small volume nebulizer is an acceptable alternate.
 **See below for PRAM scoring.
 ***FEV₁ (or as second choice, PEF) should only be used in children aged 6 years and older with demonstrated reproducibility within 10% and when performed by health care personnel trained in spirometry.
 NOTE: FEV₁ results may be discordant with the severity level indicated by the PRAM (as clinical signs and lung function are different parameters); in case of discordance, the physician is invited to use his/her best judgment to decide which parameter to use to manage the child. Do not delay treatment to obtain FEV₁ and/or peak flow.

Medication Guidelines

BRONCHODILATORS

Metered Dose Inhaler (MDI)¹ via age appropriate spacer, allow 30 sec between puffs

salbutamol (100 mcg/puff)
 1 - 3 yrs: 4 puffs/dose 4 - 6 yrs: 6 puffs/dose
 7 years and older: 8 puffs/dose

ipratropium bromide (20 mcg/puff)
 3 puffs/dose, alternate each puff with salbutamol

Wet Nebulization¹ driven by oxygen flow of 8-8 L/min via well-fitting mask

salbutamol (5mg/mL solution or unit dose nebule)
 less than 10 kg: dose = 1.25 mg; use 1.25 mg nebule OR 0.25 mL of 5 mg/mL sol'n in 3 mL NaCl
 10 to 20 kg: dose = 2.5 mg; use 2.5 mg nebule OR 0.5 mL of 5mg/mL sol'n in 3 mL NaCl
 greater than 20 kg: dose = 5 mg; use 2 x 2.5 mg nebule OR 5 mg nebule OR 1 mL of 5 mg/mL sol'n in 3 mL NaCl

ipratropium bromide
 all patients: 250 mcg, mixed with salbutamol

CORTICOSTEROIDS

Oral route
 prednisone/prednisolone 2 mg/kg x 1 (max 50 mg/dose)

Parenteral route
 methylprednisolone 1 mg/kg/dose IV or IM (max 125 mg/dose) x 1; could be repeated q 6h

MAGNESIUM SULFATE

magnesium sulfate (requires cardiorespiratory monitoring and frequent BP checks)
 50 mg/kg/dose IV x 1 (max 2 g/dose), give over 20-30 min

¹Inhaled medication delivery by MDI and age-appropriate valved spacer is preferred unless continuous oxygen is required. Small volume nebulizer is an acceptable alternate.

PRAM scoring table

O ₂ Saturation	≥ 95%	0	
	92-94%	1	
	< 92%	2	
Suprasternal retraction	Absent	0	
	Present	2	
Scalene muscle contraction	Absent	0	
	Present	2	
Air entry*	Normal	0	
	↓ at the base	1	
	↓ at the apex and the base	2	
Wheezing [§]	Minimal or absent	3	
	Absent	0	
	Expiratory only	1	
Wheezing [§]	Inspiratory (± expiratory)	2	
	Audible without stethoscope or silent chest (minimal or no air entry)	3	
PRAM score : (max. 12)			
Score Severity	0-3 Mild	4-7 Moderate	8-12 Severe

* In case of asymmetry, the most severely affected (apex-base) lung field (right or left, anterior or posterior) will determine the rating of the criterion.
 § In case of asymmetry, the two most severely affected auscultation zones, irrespective of their location (RUL, RLL, RLL, LLL) will determine the rating of the criterion.

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Disclaimer:
 This Clinical Pathway is not intended to set the standard of care applicable in any particular clinical situation. It is merely prepared as a guide to assist physicians, nurses, respiratory therapists and other healthcare providers, in deciding on the appropriate care required for a particular patient. At all times, physicians, nurses, respiratory therapists and other healthcare providers must exercise their independent clinical judgment, based on their knowledge, training and experience, taking into account the specific facts and circumstances of each patient, when deciding on the appropriate course of investigation and/or treatment to recommend in a particular clinical situation. Any reference throughout the document to specific pharmaceutical products as examples does not imply endorsement of any of these products.
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EMERGENCY DEPARTMENT ASTHMA CLINICAL PATHWAY PAEDIATRIC: 1 to 17 years

Inclusion Criteria: Age 1 to 17 years with wheeze and/or cough AND asthma diagnosis and/or past history of wheeze AND patient has had a Paediatric Respiratory Assessment Measure (PRAM) assessment.

Exclusion Criteria: Emergency Department visit for prescription refill only.

Introduction

This is a proactive tool that provides considerations for asthma management based on the Paediatric Respiratory Assessment Measure (PRAM)^{1,2}, the Canadian Paediatric Asthma Consensus Guidelines, 2003 (updated to December 2004), the Canadian Thoracic Society Asthma Management Continuum – 2010 Consensus Summary for children six years of age and over, and adults, the Canadian Thoracic Society 2012 guideline update: Diagnosis and management of asthma in preschoolers, children and adults, and other evidence from subsequent publications.

Instructions

1. **TRIAGE** to determine patient eligibility for clinical pathway.
2. **Determine initial PRAM score** (see below).
3. **Nurse/RT** to begin Paediatric Emergency Department Asthma Clinical Pathway Medical Directive **OR Physician** to choose order set according to initial PRAM.
4. **IF PATIENT'S CONDITION CHANGES**, select order set that corresponds with the revised PRAM score.
5. Refer to medication guidelines and asthma care path on reverse of physician's orders for more information.
6. **Physician /Nurse Practitioner** to complete Patient Discharge Prescription.
7. **Physician/RN/RT/Pharmacist** to review "Education Checklist" and "Discharge Instructions" with patient.

Paediatric Respiratory Assessment Measure (PRAM)

SIGNS/SCORING	0	1	2	3	PATIENT'S SCORE
O ₂ saturation (in room air)	≥ 95%	92-94%	< 92%		(max 2)
Suprasternal retraction	Absent		Present		(max 2)
Scalene muscle contraction	Absent		Present		(max 2)
Air entry*	Normal	↓ at the base	↓ at the apex and the base	Minimal or absent	(max 3)
Wheezing [§]	Absent	Expiratory only	Inspiratory (± expiratory)	Audible without stethoscope or silent chest (minimal or no air entry)	(max 3)
* In case of asymmetry, the most severely affected (apex-base) lung field (right or left, anterior or posterior) will determine the rating of the criterion.				PRAM SCORE TOTAL:	(MAX 12)
§ In case of asymmetry, the two most severely affected auscultation zones, irrespective of their location (RUL, RML, RLL, LUL, LLL), will determine the rating of the criterion.					

PRAM Score 0 – 3 **MILD** Asthma
 PRAM Score 4 – 7 **MODERATE** Asthma
 PRAM Score 8 –12 **SEVERE** Asthma
IMPENDING RESPIRATORY FAILURE is based on clinical presentation

¹Chalut, D. S., Ducharme, F. M., & Davis, G. M. (2000). The Preschool Respiratory Assessment Measure (PRAM): A responsive index of acute asthma severity. *The Journal of Pediatrics*, 137 (6), 762-768.

²Ducharme, F., Chalut, D., Plotnick, L., Savdie, C., Kudirka, D., Zhang, X., et al. (2008). The Pediatric Respiratory Assessment Measure: A Valid Clinical Score for Assessing Acute Asthma Severity from Toddlers to Teenagers. *The Journal of Pediatrics*, 152 (4), 476-480.e1.

Logos of endorsing organizations

Disclaimer: This Clinical Pathway is not intended to set the standard of care applicable in any particular clinical situation. It is merely prepared as a guide to assist physicians, nurses, respiratory therapists and other healthcare providers, in deciding on the appropriate care required for a particular patient. At all times, physicians, nurses, respiratory therapists and other healthcare providers must exercise their independent clinical judgment, based on their knowledge, training and experience, taking into account the specific facts and circumstances of each patient, when deciding on the appropriate course of investigation and/or treatment to recommend in a particular clinical situation. Any reference throughout the document to specific pharmaceutical products as examples does not imply endorsement of any of these products.

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Drug Allergies: _____ Ht: _____ cm Wt: _____ kg

MILD ASTHMA
(PRAM Score 0 to 3 or *FEV₁ greater than 70% of predicted or personal best, if known)
Refer to Medication Guidelines on Reverse

Transcription
+ Nursing
Notes

- physician to assess within 60 min
- HR, RR, SpO₂, PRAM q 60 min

FIRST HOUR OF TREATMENT *(to be administered only if not already given as per the Paediatric ED Asthma Clinical Pathway Medical Directive):*

β₂-agonist:

- salbutamol metered dose inhaler (*preferred*): _____ puffs NOW and q 60 min PRN
- OR salbutamol nebule: _____ mg NOW and q 60 min PRN
- OR salbutamol solution (5 mg/mL): _____ mg in 3 mL 0.9% sodium chloride NOW and q 60 min PRN

Additional Orders: _____

_____ Date: _____ Time: _____
 MD Name Signature

AFTER FIRST HOUR OF TREATMENT:

β₂-agonist:

- salbutamol metered dose inhaler (*preferred*): _____ puffs q 60 min PRN
- OR salbutamol nebule: _____ mg q 60 min PRN
- OR salbutamol solution (5 mg/mL): _____ mg in 3 mL 0.9% sodium chloride q 60 min PRN

Additional Orders: _____

AT DISCHARGE OR ADMISSION, CONSULT:

- Respiratory Therapist Asthma Educator Specialist/Service _____

_____ Date: _____ Time: _____
 MD Name Signature

_____ Date: _____ Time: _____
 Nurse Name Signature

Based on the Canadian Pediatric Asthma Consensus Guidelines, 2003 (updated to December 2004), the Canadian Thoracic Society Asthma Management Continuum – 2010 Consensus Summary for children six years of age and over, and adults and Canadian Thoracic Society 2012 guideline update: Diagnosis and management of asthma in preschoolers, children and adults, and other evidence from subsequent publications. Copyright © 2014, Ontario Lung Association. All rights reserved. Without the prior written permission of the Ontario Lung Association, any and all copying, reproduction, distortion, mutilation, modification, or the authorization of any such acts is strictly prohibited. September 2014. Ontario Lung Association is a registered charity operating as the Lung Health Foundation.

MEDICATION GUIDELINES: MILD ASTHMA

(PRAM Score 0-3 or *FEV₁ greater than 70% of predicted or personal best, if known)

β₂-agonist (salbutamol): one initial dose, then q 60 min PRN:

Preferred: salbutamol metered dose inhaler (MDI): 100 mcg/puff + age-appropriate spacer

Dose according to patient age:

1 to 3 yrs: 4 puffs/dose

4 to 6 yrs: 6 puffs/dose

7 yrs and older: 8 puffs/dose

Alternative: salbutamol nebule or 5 mg/mL solution (add 0.9% sodium chloride for total vol. 3-4 mL)

Dose according to patient weight:

Less than (<) 10 kg = 1.25 mg/dose = 1.25 mg nebule or 0.25 mL of a 5 mg/mL solution

10 to 20 kg = 2.5 mg/dose = 2.5 mg nebule or 0.5 mL of a 5 mg/mL solution

Greater than (>) 20 kg = 5 mg/dose = 5 mg nebule or 1 mL of a 5 mg/mL solution

Reassess Vital Signs and PRAM every 60 minutes

- ❖ If PRAM is greater than or equal to (\geq) 4 or *FEV₁ is less than 70% of predicted or personal best, if known:
 - MD to reassess *and*
 - Move to top of “MODERATE” pathway
- ❖ If PRAM remains less than or equal to (\leq) 3 or *FEV₁ is greater than or equal to 70% of predicted or personal best, if known:
 - MD to consider discharge
 - Provide asthma teaching
 - Provide discharge instructions

* FEV₁ (or as second choice, PEF) should only be used in children aged 6 years and older with demonstrated reproducibility within 10% and when performed by health care personnel trained in spirometry. NOTE: FEV₁ results may be discordant with the severity level indicated by the PRAM (as clinical signs and lung function are different parameters): in case of discordance, the physician is invited to use his/her best judgment to decide which parameter to use to manage the child. Do not delay treatment to obtain FEV₁ and/or peak flow.

Drug Allergies: _____ Ht: _____ cm Wt: _____ kg

MODERATE ASTHMA (PRAM Score 4 to 7 or *FEV₁ 50-70% of predicted or personal best, if known) <i>Refer to Medication Guidelines on Reverse</i>	Transcription + Nursing Notes
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- physician to assess within 30 min
- HR, RR, S_pO₂, PRAM every 30 min x 1 hr, then q 30-60 min until PRAM less than 4
- administer oxygen to keep S_pO₂ greater than or equal to (≥) 92%

FIRST HOUR OF TREATMENT (to be administered only if not already given as per the Paediatric ED Asthma Clinical Pathway Medical Directive):

β₂-agonist:

salbutamol metered dose inhaler (preferred): _____ puffs NOW and q 30-60 min PRN x 2 doses

OR salbutamol nebule: _____ mg NOW and q 30-60 min PRN x 2 doses

OR salbutamol solution (5 mg/mL): _____ mg in 3 mL 0.9% sodium chloride NOW and q 30-60 min PRN x 2 doses

Oral Corticosteroid, AS SOON AS POSSIBLE, within 60 (SIXTY) min of triage:

predniSONE: _____ mg (2 mg/kg; max 50 mg) PO x 1 dose

OR prednisoLONE: _____ mg (2 mg/kg; max 50 mg) PO x 1 dose

Additional Orders: _____

 MD Name Signature Date: _____ Time: _____

 Nurse Name Signature Date: _____ Time: _____

AFTER FIRST HOUR OF TREATMENT:

β₂-agonist:

salbutamol metered dose inhaler (preferred): _____ puffs q 60 min PRN

OR salbutamol nebule: _____ mg q 60 min PRN

OR salbutamol solution (5 mg/mL): _____ mg in 3 mL 0.9% sodium chloride q 60 min PRN

If not improving (PRAM unchanged or less than 3 point improvement), consider:

ipratropium bromide metered dose inhaler: 3 puffs, alternate each puff with salbutamol x 3 doses

AT DISCHARGE OR ADMISSION, CONSULT:

Respiratory Therapist Asthma Educator Specialist/Service _____

Additional Orders: _____

 MD Name Signature Date: _____ Time: _____

 Nurse Name Signature Date: _____ Time: _____

Based on the Canadian Pediatric Asthma Consensus Guidelines, 2003 (updated to December 2004), the Canadian Thoracic Society Asthma Management Continuum – 2010 Consensus Summary for children six years of age and over, and adults and Canadian Thoracic Society 2012 guideline update: Diagnosis and management of asthma in preschoolers, children and adults, and other evidence from subsequent publications. Copyright © 2014, Ontario Lung Association. All rights reserved. Without the prior written permission of the Ontario Lung Association, any and all copying, reproduction, distortion, mutilation, modification, or the authorization of any such acts is strictly prohibited. September 2014. Ontario Lung Association is a registered charity operating as the Lung Health Foundation.

MEDICATION GUIDELINES: MODERATE

(PRAM Score 4-7 or *FEV₁ 50% to 70% of predicted or personal best, if known)

β₂-agonist (salbutamol) q 30-60 min PRN x 2 doses, then q 60 min PRN:

Preferred: salbutamol metered dose inhaler 100 mcg/puff + age-appropriate spacer

Dose according to patient age:

- 1 to 3 yrs: 4 puffs/dose
- 4 to 6 yrs: 6 puffs/dose
- 7 yrs and older: 8 puffs/dose

Alternative: salbutamol nebule or 5 mg/mL solution (add 0.9% sodium chloride for total vol. 3-4 mL)

Dose according to patient weight:

- Less than (<) 10 kg = 1.25 mg/dose = 1.25 mg nebule or 0.25 mL of a 5 mg/mL solution
- 10 to 20 kg = 2.5 mg/dose = 2.5 mg nebule or 0.5 mL of a 5 mg/mL solution
- Greater than (>) 20 kg = 5 mg/dose = 5 mg nebule or 1 mL of a 5 mg/mL solution

PLUS

Oral Corticosteroid AS SOON AS POSSIBLE, within 60 (SIXTY) minutes of triage:

predniSONE/prednisoLONE: 2mg/kg/dose PO x 1 dose (max 50 mg)

If not improving, consider:

Anticholinergic (ipratropium bromide):

Preferred: ipratropium bromide metered dose inhaler (20 mcg/puff)+ age-appropriate spacer:
3 puffs q 20 min x 3 doses, alternate each puff with salbutamol

Reassess Vital Signs and PRAM every 30 to 60 minutes

- ❖ If PRAM is greater than or equal to (\geq) 8 at any time OR if PRAM is unchanged OR less than 3-point improvement in PRAM or *FEV₁ is less than 50% of predicted or personal best, if known:
 - MD to reassess *and*
 - Move to top of “SEVERE” pathway
- ❖ If 6-8 hours post corticosteroid, PRAM is greater than or equal to (\geq) 4 or *FEV₁ is less than 70% of predicted or personal best, if known:
 - MD to reassess and consider admission
- ❖ If PRAM score less than or equal to (\leq) 3 or *FEV₁ is greater than or equal to 70% of predicted or personal best, if known:
 - MD to consider discharge
 - provide asthma teaching
 - provide discharge instructions

* FEV₁ (or as second choice, PEF) should only be used in children aged 6 years and older with demonstrated reproducibility within 10% and when performed by health care personnel trained in spirometry. NOTE: FEV₁ results may be discordant with the severity level indicated by the PRAM (as clinical signs and lung function are different parameters): in case of discordance, the physician is invited to use his/her best judgment to decide which parameter to use to manage the child. Do not delay treatment to obtain FEV₁ and/or peak flow.

Hospital Logo	Emergency Department Asthma Clinical Pathway Paediatric: 1 to 17 years PHYSICIAN'S ORDERS	Patient Identification
Drug Allergies: _____ Ht: _____ cm Wt: _____ kg		
SEVERE ASTHMA (PRAM Score 8 to 12 or *FEV₁ less than 50% of predicted or personal best, if known) <i>Refer to Medication Guidelines on Reverse</i>		Transcription + Nursing Notes
<input checked="" type="checkbox"/> physician to assess urgently <input checked="" type="checkbox"/> administer oxygen to keep S _p O ₂ greater than or equal to (≥) 92% <input checked="" type="checkbox"/> HR, RR, S _p O ₂ , PRAM q 20 min for 1 hour until PRAM less than 8, then q 30-60 min <input type="checkbox"/> continuous cardiopulmonary monitoring <input type="checkbox"/> blood gas: <input type="checkbox"/> arterial <u>OR</u> <input type="checkbox"/> venous <input type="checkbox"/> IV access: <input type="checkbox"/> saline lock <u>OR</u> <input type="checkbox"/> _____		
FIRST HOUR OF TREATMENT <i>(to be administered only if not already given as per the Paediatric ED Asthma Clinical Pathway Medical Directive):</i> β₂-agonist and anticholinergic: <input type="checkbox"/> salbutamol metered dose inhaler (MDI) : _____ puffs AND ipratropium bromide MDI: 3 puffs q 20 min x 3 doses; alternate puffs of each medication <u>OR</u> <input type="checkbox"/> salbutamol nebulized (nebule or 5 mg/mL solution): _____ mg MIXED WITH 250 mcg ipratropium bromide (125mcg/mL or 250 mcg/mL) q 20 min x 3 doses Systemic Corticosteroid, AS SOON AS POSSIBLE, within 20 (TWENTY) mins of triage: <input type="checkbox"/> predniSONE: _____ mg (2 mg/kg; max 50 mg) PO x 1 dose <u>OR</u> <input type="checkbox"/> prednisoLONE: _____ mg (2 mg/kg; max 50 mg) PO x 1 dose <u>OR</u> <input type="checkbox"/> methylPREDNISolone IV: _____ mg (1 mg/kg/dose; max 125 mg/dose) x 1 dose NOW (infuse over 3 - 15 minutes) <u>OR</u> <input type="checkbox"/> methylPREDNISolone IM: _____ mg (1 mg/kg/dose; max 125 mg/dose) x 1 dose NOW Additional Orders: _____ _____ _____		
MD Name	Signature	Date: _____ Time: _____
AFTER FIRST HOUR OF TREATMENT: β₂-agonist: <input type="checkbox"/> salbutamol metered dose inhaler: _____ puffs q _____ min PRN <u>OR</u> <input type="checkbox"/> salbutamol nebule: _____ mg q _____ min PRN <u>OR</u> <input type="checkbox"/> salbutamol solution (5 mg/mL): _____ mg in 3 mL 0.9% sodium chloride q _____ min PRN If not improving (PRAM unchanged or less than 3 point improvement), consider: <input type="checkbox"/> magnesium sulfate IV: _____ mg (50 mg/kg/dose; max 2g/dose x 1 dose NOW; give over 20 to 30 minutes Note: may cause severe hypotension - check BP q 5 min during infusion and x 30 min after		
AT DISCHARGE OR ADMISSION, CONSULT: <input type="checkbox"/> Respiratory Therapist <input type="checkbox"/> Asthma Educator <input type="checkbox"/> Specialist/Service _____ Additional Orders: _____ _____ _____		
MD Name	Signature	Date: _____ Time: _____
Nurse Name	Signature	Date: _____ Time: _____

Based on the Canadian Pediatric Asthma Consensus Guidelines, 2003 (updated to December 2004), the Canadian Thoracic Society Asthma Management Continuum – 2010 Consensus Summary for children six years of age and over, and adults and Canadian Thoracic Society 2012 guideline update: Diagnosis and management of asthma in preschoolers, children and adults, and other evidence from subsequent publications. Copyright © 2014, Ontario Lung Association. All rights reserved. Without the prior written permission of the Ontario Lung Association, any and all copying, reproduction, distortion, mutilation, modification, or the authorization of any such acts is strictly prohibited. September 2014. Ontario Lung Association is a registered charity operating as the Lung Health Foundation.

MEDICATION GUIDELINES: SEVERE

(PRAM 8 – 12 or *FEV₁ less than 50% of predicted or personal best, if known)

β₂-agonist (salbutamol) q 20 minutes x 3 doses, then q 20-60 minutes PRN:

Preferred: salbutamol metered dose inhaler (MDI) 100 mcg/puff + age-appropriate spacer

Dose according to patient age:

- 1 to 3 yrs: 4 puffs/dose
- 4 to 6 yrs: 6 puffs/dose
- 7 yrs and older: 8 puffs/dose

Alternative: salbutamol nebule or 5 mg/mL solution

(add 0.9% sodium chloride for total volume 3-4 mL)

Dose according to patient weight:

Less than (<) 10 kg: 1.25 mg/dose = 1.25 mg nebule or 0.25 mL of a 5 mg/mL solution

10 to 20 kg: 2.5 mg/dose = 2.5 mg nebule or 0.5 mL of a 5 mg/mL solution

Greater than (>) 20 kg: 5 mg/dose = 5 mg nebule or 1 mL of a 5 mg/mL solution

PLUS

Anticholinergic (ipratropium bromide) q 20 minutes x 3 doses:

Preferred: ipratropium bromide MDI (20 mcg/puff) + age-appropriate spacer:

3 puffs q 20 min x 3 doses, alternate each puff with salbutamol

Alternative: ipratropium bromide nebule or solution (125 mcg/mL or 250 mcg/mL):

250 mcg q 20 min x 3 doses; mix with salbutamol; add 0.9% sodium chloride for a total volume of 3-4 mL

PLUS

Systemic Corticosteroid AS SOON AS POSSIBLE, within 20 (TWENTY) minutes of triage:

PredniSONE/PrednisoLONE: 2mg/kg/dose PO x 1 dose (max 50 mg)

OR if there is a concern about reliability of oral route:

methylPREDNISolone: 1 mg/kg/dose q 6 h IV or IM (max 125 mg /dose); give IV dose over 3-15 min

If not improving, consider:

Magnesium sulfate: 50 mg/kg/dose IV ONCE (max. 2 g per dose) over 20-30 min

Attention: may cause severe hypotension; ensure IV access, monitor BP q 5 minutes during infusion and for 30 minutes after dose end

Reassess Vital Signs and PRAM every 20 to 60 minutes

- ❖ If poor response (PRAM unchanged or less than 3 point improvement) OR signs of impending respiratory failure at any time:
 - MD to reassess STAT and
 - Move to top of “IMPENDING RESPIRATORY FAILURE” pathway
- ❖ If 4 hours post corticosteroid PRAM score is greater than or equal to (≥) 4 or *FEV₁ is less than 70% of predicted or personal best, if known:
 - MD to reassess and consider admission
- ❖ If PRAM score improving, move to “MODERATE” pathway

* FEV₁ (or as second choice, PEF) should only be used in children aged 6 years and older with demonstrated reproducibility within 10% and when performed by health care personnel trained in spirometry. NOTE: FEV₁ results may be discordant with the severity level indicated by the PRAM (as clinical signs and lung function are different parameters); in case of discordance, the physician is invited to use his/her best judgment to decide which parameter to use to manage the child. Do not delay treatment to obtain FEV₁ and/or peak flow.

Drug Allergies: _____ Ht: _____ cm Wt: _____ kg

IMPENDING RESPIRATORY FAILURE Lethargy, Cyanosis, Decreasing Respiratory Effort and/or Rising PCO₂ <i>Refer to Medication Guidelines & Algorithm on Reverse</i>	Transcription + Nursing Notes
--	-------------------------------------

- physician to assess STAT and remain in attendance until patient stabilized
- administer 100% oxygen
- support ventilation if required (bag + mask) Note: avoid high rates and/or volumes
- continuous cardiopulmonary monitoring
- HR, RR, SpO₂, PRAM q 15 min
- obtain IV access (if not already done): fluid _____ rate of infusion _____
- NPO
- blood gas: arterial OR capillary
- chest radiograph (portable)
- contact **CritiCall Ontario: 1-800-668-4357** to be connected with regional ICU/tertiary care centre for further support and to arrange transfer

IMMEDIATE MANAGEMENT:

β₂-agonist and anticholinergic:

- salbutamol nebulized (nebule or 5 mg/mL solution): _____ mg MIXED WITH 250 mcg ipratropium bromide (125 mg/mL or 250 mg/mL), continuously with oxygen, add 0.9% sodium chloride for a total volume of 3 to 4 mL

Systemic Corticosteroid, AS SOON AS POSSIBLE after first salbutamol/ipratropium dose (if not already given):

- methylPREDNISolone IV: _____ mg (1 mg/kg/dose; max 125 mg/dose) x 1 dose NOW and q 6 h (infuse over 3 to 15 minutes)

OR methylPREDNISolone IM: _____ mg x 1 dose NOW and q 6 h

Magnesium sulfate:

- magnesium sulfate IV: _____ mg (50 mg/kg/dose; max. 2 g/dose) x 1 dose NOW; give over 20 to 30 min

Note: may cause severe hypotension; check BP q 5 mins during infusion and for 30 mins after

AT DISCHARGE OR ADMISSION, CONSULT:

- Respiratory Therapist Asthma Educator Specialist/Service _____

Additional Orders: _____

MD Name	Signature	Date: _____	Time: _____
Nurse Name	Signature	Date: _____	Time: _____

Based on the Canadian Pediatric Asthma Consensus Guidelines, 2003 (updated to December 2004), the Canadian Thoracic Society Asthma Management Continuum – 2010 Consensus Summary for children six years of age and over, and adults and Canadian Thoracic Society 2012 guideline update: Diagnosis and management of asthma in preschoolers, children and adults, and other evidence from subsequent publications. Copyright © 2014, Ontario Lung Association. All rights reserved. Without the prior written permission of the Ontario Lung Association, any and all copying, reproduction, distortion, mutilation, modification, or the authorization of any such acts is strictly prohibited. September 2014. Ontario Lung Association is a registered charity operating as the Lung Health Foundation.

MEDICATION GUIDELINES: IMPENDING RESPIRATORY FAILURE

Lethargy, Cyanosis, Decreasing Respiratory Effort and/or Rising PCO₂

Bronchodilators (β_2 -agonist and Anticholinergic):

continuous nebulization with oxygen, physician to reassess as necessary

salbutamol nebule or 5 mg/mL solution (dose according to patient weight):

Less than (<) 10 kg = 1.25 mg/dose = 1.25 mg nebule or 0.25 mL of a 5 mg/mL solution

10 to 20 kg = 2.5 mg/dose = 2.5 mg nebule or 0.5 mL of a 5 mg/mL solution

Greater than (>) 20 kg = 5 mg/dose = 5 mg nebule or 1 mL of a 5 mg/mL solution

AND

ipratropium bromide nebule or solution (125 mcg/mL or 250 mcg/mL):

250 mcg/dose; mix with salbutamol, add 0.9% sodium chloride for total volume of 3 to 4 mL

PLUS

Systemic Corticosteroid, AS SOON AS POSSIBLE after first bronchodilator dose:

methylPREDNISolone 1 mg/kg/dose q 6 h IV or IM (max 125 mg /dose); give IV dose over 3-15 min

PLUS

Magnesium sulfate:

50 mg/kg/dose IV ONCE (maximum 2 g per dose); give over 20-30 minutes

Attention: may cause severe hypotension; ensure IV access, monitor BP q 5 min during infusion and for 30 min after

Hospital Logo

**Emergency Department
Asthma Clinical Pathway
Paediatric: 1 to 17 years
Education Checklist**

Patient Education Checklist

Learning Goals Reviewed with Patient (To be completed by Physician / Nurse / Nurse Practitioner / RT / Pharmacist)	Initials & Comments
<p>1. Assessed device/spacer technique and demonstrated optimal technique: Metered dose inhaler (MDI) with spacer:</p> <ul style="list-style-type: none">• Ensure age/ability-appropriate valved spacer/device and demonstrate optimal technique• <u>Spacer with mouthpiece</u> - Shake MDI canister and place end into holding chamber, breathe out, place holding chamber mouthpiece into mouth and make a seal, release puff, inhale slowly (no whistle), hold for 10 seconds, exhale, wait 30 seconds between each puff of the same MDI.• <u>Spacer with mask</u> - Shake canister, place end of MDI into holding chamber, place mask over mouth and nose and make a seal, release puff, allow patient to inhale and exhale approximately 3 times. Wait 30 seconds between each puff of the same MDI.	
<p>2. Reviewed basics of asthma:</p> <ul style="list-style-type: none">• Airway inflammation (swelling), increased mucus, and bronchospasm (airways narrow)	
<p>3. Symptom recognition:</p> <ul style="list-style-type: none">• Cough, wheeze, chest tightness and/or shortness of breath	
<p>4. Reviewed asthma triggers:</p> <ul style="list-style-type: none">• Know your asthma triggers• Avoid cigarettes and secondhand smoke	
<p>5. Reviewed asthma medications:</p> <p>a. Relievers (e.g. Airomir®, Apo-Salvent®, Bricanyl®, Novo-salmol®, salbutamol, or Ventolin®) – (often blue containers)</p> <ul style="list-style-type: none">• Relax smooth muscle around airways.• Rapid relief <p>b. Controllers (e.g. Advair®, Alvesco®, Asmanex™ beclomethasone, Flovent®, Pulmicort®, QVAR®, or Symbicort®, Zenhale®)</p> <ul style="list-style-type: none">• Treat airway inflammation and mucus;• Need to be taken regularly even when feeling well. <p>c. Oral Steroids</p> <ul style="list-style-type: none">• (e.g. prednisone, prednisolone)• Treats severe airway inflammation and mucous• Short term therapy	
<p>6. Asthma Quiz for Kids – (see reverse of discharge plan)</p> <ul style="list-style-type: none">• Measure of current control	
<p>7. Arrange regular follow-up</p> <ul style="list-style-type: none">• Family Physician, Paediatrician, Asthma Educator, Specialist	
<p>8. Discharge Plan and Prescription</p> <ul style="list-style-type: none">• Given and explained• If no drug plan, refer to Social Work or Trillium Fund (available through most pharmacies)	
<p>9. Hospital's Asthma (if available) or the Lung Health Foundation booklet given to patient.</p>	
<p>Name (print): _____ Signature: _____ Status: _____ Date (YYYY/MM/DD): _____ Time: _____</p>	

**Emergency Department
Asthma Clinical Pathway
Paediatric: 1 to 17 years
Discharge Instructions**

ADDRESSOGRAPH

PHYSICIAN: Complete and initial beside selected orders.

PHARMACIST: Label short-acting (relief) inhaler as "Take as directed as per EDACP Discharge Instructions". Fill other medications as directed by physician.

Weight: _____ kg

GREEN ZONE

Asthma under control



Breathing is good.
Run & play normally.
Cough or wheeze less than 4 times a week.

CONTROLLER Medicine: _____ (specify name)
_____ mcg/inhalation, take _____ inhalations _____ times per day, for 3 months, Refill **3**
 metered dose inhaler (puffer) **OR** dry powder inhaler
 Other _____

QUICK RELIEF Medicine: _____ (usually a blue inhaler) (specify name)
_____mcg/inhalation, take _____inhalations every 4 to 6 hours as needed, 1 inhaler, Refill **1**
 metered dose inhaler (puffer) **OR** dry powder inhaler

SPACER DEVICE: (specify name) _____
 Infant with mask Paediatric with mask Adult with mouthpiece

YELLOW ZONE

Asthma not well controlled



Signs of a cold.
Mild to moderate cough or wheezing.
Waking up because of asthma.

Continue GREEN ZONE CONTROLLER medicine.
Take QUICK RELIEF medicine every 4 hours until better.

If the effect of the QUICK RELIEF medicine does not last 4 hours, or if the child's symptoms are getting worse, see a doctor.

Today, your child was seen in the Emergency Department for a significant asthma exacerbation. To treat this attack, in addition to your Controller and Quick Relief medicines, also give:
 prednisolone liquid _____ mg daily for _____ days, Refill **0** **OR** prednisone tablet _____ mg daily for _____ days, Refill **0**

Additional discharge instructions: _____

RED ZONE

Asthma out of control



Very short of breath.
Severe wheezing.
"Pulling in" of skin between ribs.
Cannot do usual activities.
Severe trouble breathing, walking or talking.
Blueness of lips or skin.
Tired because of effort of breathing.

Take QUICK RELIEF medicine (usually a blue inhaler) every 4 hours.
If the effect of the QUICK RELIEF medicine does not last 4 hours, or if the child's symptoms are getting worse, seek medical attention NOW.
If still in Red Zone after 15 minutes or you have not reached your doctor, call 911 or go to nearest emergency department NOW.
Take QUICK RELIEF medicine as needed (even every 10 or 20 minutes if not improving) on way to hospital.

Schedule appointment with: family doctor asthma educator specialist _____ within _____ weeks.
If you have any questions about asthma, call the Lung Health Foundation Lung Health Information Line: 1-888-344-LUNG (5864)

Physician: _____ **License #** _____ **Signature:** _____ **Date:** _____
(print name) (dd/mm/yyyy)

ASTHMA QUIZ FOR KIDZ*

* Adapted from Canadian Respiratory Journal 2004; 11(8):541-6.

- | | YES | NO |
|---|--------------------------|--------------------------|
| 1. Did you cough, wheeze, or have a hard time breathing 4 or more days out of the last 7 days ? | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Did you wake up at night because you were coughing, or wheezing, or having a hard time breathing 1 or more times in the last 7 days ? | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Did you use your blue puffer 4 or more times in the last 7 days ? | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. In the last 7 days , did you do less exercise or sports because it was making you cough, wheeze, or you were having a hard time breathing? | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. In the last 30 days , did you miss school or regular activities because you were coughing, wheezing, or having a hard time breathing? | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. In the last 30 days , did you go to a clinic or a hospital without an appointment because you were coughing, wheezing, or having a hard time breathing? | <input type="checkbox"/> | <input type="checkbox"/> |
- How many times did you answer **YES**? _____
 - If you said **YES 2** or more times, your asthma is not well controlled. Talk to your mom and dad about seeing a doctor. Let your doctor be your asthma coach!

TRIGGERS

Follow these steps to avoid these common triggers:



COLDS: Most common trigger. Wash hands before touching your mouth or nose to prevent colds. Follow Yellow Zone at first sign of a cold.



SMOKE: Don't smoke! Do not allow others to smoke in your home or car. Encourage your parents to STOP smoking. Even if they smoke outside, the smoke in their clothes and hair can trigger your asthma.



AIR POLLUTION: Avoid fumes and chemicals.

Follow these steps if you have any of the following allergies:



PETS: Avoid pets with fur or feathers. If you have pets, wash them often.



DUST MITES: Wash bed sheets in hot water. Vacuum and dust often. Cover pillows and mattresses with dust mite-resistant covers.



POLLEN: Close windows during pollen season (Spring and Fall). Air conditioning helps. Avoid freshly cut grass.



MOLD: Keep bathroom and basement dry. Keep away from decomposing leaves and garden waste.

Controlling your asthma

1. Avoid your triggers.
2. Know your medication and how and when to take it. Take controller medications regularly.
3. Follow your action plan.
4. After any emergency room visit, you must schedule a follow-up appointment with a doctor in the next 2 weeks.
5. Always have spare quick relief medication (blue inhaler) available.

Medical Directive and/or Delegation TemplateTemplate for Use by Physicians or Authorizers **with** Ordering Authority

Title: **Emergency Department Asthma
Medical Directive – Paediatric Age 1 to
17 years** **Number: (set by hospital)**

Activation Date: (set by hospital)**Review due by: (set by hospital)****Sponsoring/Contact Person(s)***(name, position, contact particulars):*

**(hospital based site champion e.g. professional practice advisor(s),
clinical educator)
Lung Health Foundation – lunghealth.ca**

Order and/or Delegated Procedure:**Appendix Attached: Yes No Title: Appendix B - Flowchart**

1. Supplemental oxygen to keep SaO₂ at 92% or greater
2. Salbutamol: metered dose inhaler (MDI) with spacer device (100 mcg/puff) 4 to 8 puffs per dose or nebulized 1.25 mg to 5 mg per dose in 3 mL 0.9% sodium chloride, as per flowchart (Appendix B) attached. Administer first dose as soon as possible. May administer up to 3 doses depending on severity score. See flowchart (Appendix B) for specific number of doses and frequency. MDI with spacer is preferred delivery system unless continuous oxygen is required.
3. Ipratropium bromide: MDI with spacer device (20 mcg/puff) 3 puffs per dose or nebulized ipratropium bromide (250 mcg per dose) times 3 doses. Administer first dose as soon as possible. Administer in alternating puffs with salbutamol (if MDI) or mixed with salbutamol (if nebulized). See flowchart (Appendix B) for specific number of doses and frequency.
Note: For use in 'Severe' and 'Impending Respiratory Failure' streams only.
4. PredniSONE/prednisoLONE: 2 mg/kg to a maximum of 50 mg PO once, as soon as possible following salbutamol: within 60 minutes of triage for 'Moderate' stream and within 20 minutes of triage for 'Severe' and 'Impending Respiratory Failure' streams. See flowchart (Appendix B).
Note: do not use in 'Mild' stream.
5. Spirometry (FEV₁) or Peak Expiratory Flow (PEF) in children 6 years and over, performed by healthcare personnel trained in spirometry. See flowchart (Appendix B).

Recipient Patients:	Appendix Attached: <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No Title: Appendix A: Severity of Asthma Exacerbation
<p>Patients who are registered in the Emergency Department presenting with symptoms of an acute asthma exacerbation (e.g. dyspnea, wheezing), under the care of an authorizing physician, who meet the following:</p> <p><u>Inclusion Criteria:</u> Age 1 to 17 years with wheeze and/or cough AND asthma diagnosis and/or past history of wheeze AND who have had a Paediatric Respiratory Assessment Measure (PRAM) assessment (Appendix A).</p> <p><u>Exclusion Criteria:</u> ED visit for prescription refill only.</p>	
Authorized Implementers:	Appendix Attached: <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No Title:
<p>Nurses, Respiratory Therapists, Pharmacists registered and in good standing with their respective regulatory college in Ontario, who have received up-to-date education and training on this medical directive.</p>	
Indications and Contraindications:	Appendix Attached: <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No Title:
<p><u>Indications:</u> Age 1 to 17 years with wheeze and/or cough AND asthma diagnosis and/or past history of wheeze, AND presenting with mild, moderate or severe symptoms of asthma as assessed by Paediatric Respiratory Assessment Measure (PRAM) score.</p> <p><u>Contraindications:</u></p> <p>Re: medical directive in whole if patient has any active chronic conditions other than asthma, suspend medical directive and obtain physician assessment and orders for care.</p> <p>Re: salbutamol heart rate greater than 200 beats/min; and/or allergic to salbutamol hold salbutamol and proceed with rest of medical directive. Obtain physician assessment as soon as possible.</p> <p>Re: ipratropium bromide allergic to ipratropium bromide hold ipratropium bromide and proceed with rest of medical directive</p> <p>Re: predniSONE or predniSLONE patient unable to take medication via oral route request physician assessment and orders and proceed with remainder of medical directive. patient with active or suspected incubation of chickenpox infection hold prednisone/prednisolone and proceed with rest of medical directive. Obtain physician assessment as soon as possible. allergic to prednisone or prednisolone hold prednisone or prednisolone and proceed with rest of medical directive. Obtain physician assessment as soon as possible</p> <p>Re: spirometry (FEV₁) or Peak Expiratory Flow (PEF) – not available in most emergency departments FEV₁ (or as second choice, PEF) should only be used in children aged 6 years and older, performed by healthcare personnel trained in spirometry. NOTE: results may not be reproducible during an exacerbation; however, if FEV₁ can be done reproducibly, its value should take precedence to guide therapy and consider discharge over the PRAM. PEF measurement is not recommended in children and adolescents unless spirometry is not available AND there is demonstrated reproducibility within 10%. If patient is unable to perform test proceed with assessment and treatment based on the PRAM NOTE: Do not delay PRAM assessment or treatment to obtain FEV₁ or PEF</p>	

Consent:	Appendix Attached: <input type="checkbox"/> Yes <input type="checkbox"/> No Title:
Consent (verbal and/or implied) must be provided by patient or substitute decision maker prior to commencing medical directive.	
Guidelines for Implementing the Order/ Procedure:	Appendix Attached: <input type="checkbox"/> Yes <input type="checkbox"/> No Title:
<p>This medical directive allows registered nurses, registered respiratory therapists and/or pharmacists to initiate pharmacotherapy with inhaled bronchodilators and oral corticosteroids as soon as possible to children and adolescents who present to the Emergency Department (ED) with a clinical picture consistent with asthma and who are entered into the Paediatric Emergency Department Asthma Clinical Pathway (Asthma Pathway).</p> <p>Although it is intended that these patients will be treated by a physician according to the Asthma Pathway, the earliest possible therapy initiated by nurse / respiratory therapist / pharmacist will allow symptom relief while awaiting assessment by the physician and is anticipated to shorten the patient's length -of-stay in the ED and reduce the rate of hospital admission.</p> <p>Dosage, frequency and choice of medication will be determined by the patient's age and degree of respiratory distress as described in the Asthma Pathway appended to this medical directive. The Physician will be notified immediately at any time if the patient is not responding or is deteriorating with the planned treatment.</p> <p>Any untoward event suspected to be related to the implementation of this directive will be reported immediately to the attending physician. The event will also be documented in the patient's chart.</p>	
Documentation and Communication:	Appendix Attached: <input type="checkbox"/> Yes <input type="checkbox"/> No Title:
Review and Quality Monitoring Guidelines:	Appendix Attached: <input type="checkbox"/> Yes <input type="checkbox"/> No Title:
Administrative Approvals (as applicable):	Appendix Attached: <input type="checkbox"/> Yes <input type="checkbox"/> No Title:
Approving Physician(s)/Authorizer(s):	Appendix Attached: <input type="checkbox"/> Yes <input type="checkbox"/> No Title:

Emergency Department Paediatric Asthma Medical Directive**Appendix A: Severity of asthma exacerbation**

Assess and calculate Paediatric Respiratory Assessment Measure (PRAM) Score using the following scale.

SIGN/SCORING	0	1	2	3	Patient's Score
1. O ₂ saturation (in room air)	≥ 95%	92-94%	< 92%		_____ (max 2)
2. Suprasternal retraction	Absent		Present		_____ (max 2)
3. Scalene muscle contraction	Absent		Present		_____ (max 2)
4. Air entry*	Normal	↓ at the base	↓ at the apex and the base	Minimal or absent	_____ (max 3)
5. Wheezing [§]	Absent	Expiratory only	Inspiratory (± expiratory)	Audible without stethoscope or silent chest (minimal or no air entry)	_____ (max 3)

PRAM Score Total: _____
(max 12)

* In case of asymmetry, the most severely affected (apex-base) lung field (right or left, anterior or posterior) will determine the rating of the criterion.

§ In case of asymmetry, the two most severely affected auscultation zones, irrespective of their location (RUL, RML, RLL, LUL, LLL), will determine the rating of the criterion.

Asthma Severity Index

Pram Score 0 – 3 indicates **MILD** Asthma

Pram Score 4 – 7 indicates **MODERATE** Asthma

Pram Score 8 – 12 indicates **SEVERE** Asthma

IMPENDING RESPIRATORY FAILURE is based on clinical presentation

References:

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Emergency Department Paediatric Asthma Medical Directive

Appendix B: Medical Directive Flowchart

PRAM 0-3
Mild

PRAM 4-7
Moderate

PRAM 8-12
Severe

Impending Respiratory Failure

Administer oxygen as required to keep SpO₂ ≥ 92%

Establish baseline FEV₁, if possible (patient age 6 yrs or older, able to follow directions, trained staff member available, able to demonstrate reproducibility* within 10%)

* results may not be reproducible during an exacerbation
Do not delay pharmacotherapy while obtaining FEV₁

If patient's condition worsens at any time, notify physician immediately

MD to assess STAT and remain in attendance until patient is stabilized

ADMINISTER:

salbutamol metered dose inhaler (MDI)
preferred, unless continuous oxygen required; dose by patient's age

1 – 3 yrs = 4 puffs
4 – 6 yrs = 6 puffs
7 yrs and older = 8 puffs

via metered dose inhaler (MDI) and age appropriate spacer; allow 30 seconds between each puff.

OR

salbutamol (solution/nebule) via continuous nebulization, dose by patient's weight.

less than (<) 10kg = 1.25 mg
10 – 20 kg = 2.5 mg
greater than (>) 20 kg = 5 mg

If necessary increase volume to 3 mL with normal saline

REPEAT:

- PRAM 0 to 3: q 60 minutes PRN, to a maximum of 2 doses in the first hour
- PRAM 4 to 7: q 30 to 60 minutes PRN, to a maximum of 2 doses in first hour

ADMINISTER:

salbutamol metered dose inhaler (MDI)
preferred, unless continuous oxygen required; dose by patient's age

1 – 3 yrs = 4 puffs
4 – 6 yrs = 6 puffs
7 yrs and older = 8 puffs

AND
ipratropium bromide metered dose inhaler (MDI) – 3 puffs

via metered dose inhaler (MDI) and age appropriate spacer; allow 30 seconds between each puff; alternate each puff of ipratropium bromide with salbutamol

OR

salbutamol (solution/nebule) via continuous nebulization, dose by patient's weight:

less than (<) 10kg = 1.25 mg
10 – 20 kg = 2.5 mg
greater than (>) 20 kg = 5 mg

AND
ipratropium bromide (solution/nebule):
250 mcg mixed with salbutamol; add normal saline for total volume of 3mL

REPEAT:

- (both salbutamol and ipratropium bromide)
- PRAM 8 to 12: q 20 minutes x 3 doses in the first hour
- "Impending Respiratory Failure": repeat continuously

Assess patient regarding requirement for corticosteroids (except for "mild" severity):
Does patient have active or suspected chickenpox infection?

YES

Hold corticosteroid
Notify MD.
Obtain further orders for therapy.

NO

ADMINISTER ORAL CORTICOSTEROIDS*:
for "M oderate" (PRAM 4-7) **as soon as possible** and within 60 (sixty) minutes of triage:
for "S evere" (PRAM 8-12) and "Impending Respiratory Failure" **as soon as possible** and within 20 (twenty) minutes of triage:
predniSONE/predniSOLONE 2 mg/kg PO x 1 dose (maximum 50 mg/dose)
*if patient unable to take medication via oral route, notify MD immediately

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