Asthma Exacerbation (Acute): Initial Management in known Asthmatics (Pediatrics 1 year to less than 17 years of age)

Quicklinks

Site Applicability

- The following VCH & PHC Departments:
  - Emergency Departments (ED)
  - Urgent Care Centres (UCC)
  - Health Care Centres (HCC)

Practice Level

Profession	Setting	Basic Skill	Advanced Skill (requiring additional education)
RN	• Emergency Departments • UBCH UCC • WHCC & PHC HCC	With advanced education where the following are core competencies and expectations of the role: • Administration of oxygen to treat hypoxia	**Nurse Independent Activity (NIA):** • **With completion of required additional education of Understanding Autonomous Practice & Nurse Independent Activities (NIA)/ Nurse Initiated Protocols (NIP), the following NIA has been approved for use as noted in the site applicability above:** o Administration of salbutamol or ipratropium bromide to treat respiratory distress in known asthmatics

RT	• Emergency Departments • UBCH UCC • WHCC & PHC HCC	• Administration of oxygen to treat hypoxia • Administration of inhaled bronchodilators as per provider order to treat an acute asthma exacerbation	

Requirements

- NIAs and NIPs for RNs and RPNs is supported by:
  - **VPP:** Nurse Independent Activities (NIA) Policy and Nurse-Initiated Protocols (NIP)
- NIA and NIPs:
  - NIA can only be used at sites where the NIA has been approved
  - Physician/Nurse Practitioner (NP) orders override the use of NIA

Suggested Education

- Learninghub course: Metered Dose Inhaler (MDI) Use – Best Practice in the Emergency Department – Recommendations for bronchodilator treatment in the ED for patients with astha or COPD (adult and pediatric)

Need to Know

Asthma is defined as a common chronic respiratory disorder characterized by (1) symptoms such as, dyspnea, chest tightness, wheezing, sputum production, and cough, (2) airflow obstruction, (3) bronchial hyper-responsiveness and (4) underlying airway inflammation.[2,3] The interaction of these four features determine the clinical manifestations and severity of an acute asthma exacerbation and potential response to treatment. Early recognition and treatment of acute asthma exacerbations is key to improving outcomes for clients.[1,2]

Pediatric asthma has been identified as a significant health issue in British Columbia (BC). It is the most common chronic disease impacting children and is a leading cause of missed school days and hospital visits. As there is no known cure for asthma; efforts are focused on the delivery of timely and appropriate management strategies to minimize the individual and community level impacts. Children and families can be supported to control their asthma and improve their overall quality of life.

Symptoms can be episodic or persistent and present in a variety of ways that include: chest tightness, coughing, wheezing, and shortness of breath. These symptoms and episodes of severe shortness of breath can be triggered by exposures such as allergens, environmental irritants, viral infections, exercise and

strong emotions. Poor asthma control can negatively impact a child's overall quality of life, impacting their ability to participate in sports, school, and other recreational activities.
For treatment of an asthma exacerbation, the use of MDI's with a spacer is recommended as a first line treatment modality with improved clients outcomes (Cates, Welsh, & Rowe, 2013). Nebulizers should only be used where the client is not responding well or tolerating an MDI with a spacer.

Equipment and Supplies

- Stethoscope
- Pulse Oximeter
- Oxygen source (portable tank or wall unit)
- Air compressor/nebulizer
- Oxygen administration equipment: Aerosol mask; nasal cannula; simple face mask; non-rebreather mask; oxygen tubing
- Salbutamol and/or Ipratropium Bromide Metered Dose Inhalers (MDI) and appropriate sized spacer with mouth piece of mask (if clinically indicated)
  OR
- Salbutamol and/or Ipratropium solution for nebulization

Protocol

1. Perform hand hygiene. Perform point of care risk assessment per Infection Prevention and Control (IPAC) recommendation, and don necessary PPE.
2. Determine eligibility for initiating the Nurse Initiated Protocol – Initial Management of Acute Asthma Exacerbation – Pediatrics.

   INCLUSION CRITERIA:

   a. Patient's age: children between 1 year and less than 17 years of age, **AND**
   b. Presenting with wheezing **OR** respiratory distress, **AND**
   c. Previous diagnosis of asthma **OR** been treated 2 times prior with bronchodilator for wheezing.

***PLEASE NOTE:** Children less than 1 year of age with their first known episode of wheezing should not be routinely treated as a part of the pathway, treating physicians may choose to include these children in the pathway.

3. Assess severity of symptoms via: Respiratory rate, heart rate, blood pressure, temperature, oxygen saturation on room air, and PRAM (Pediatric Respiratory Assessment Measure) score.

   If age of the child/youth, is greater than 6 years old, able to produce reasonable effort, and display appropriate technique, then may obtain peak expiratory flow (PEF).
4. Take brief medical history if possible (otherwise proceed to next step): Duration and nature of symptoms, treatments used (reliever, preventer – number of puffs used at home and frequency), trigger factors, previous admissions or similar presentations

5. Alert provider (physician/nurse practitioner) to facilitate assessment, diagnosis, treatment for child/youth presenting with moderate/severe symptoms as defined by PRAM score.
6. Administer oxygen as needed to maintain SpO_2 92% or more.
7. For PRAM Score 0-7 mild and moderate asthma exacerbation, initiate treatment based on severity as determined by PRAM score (See Appendix C), with medication dosages according to the chart (See Appendix D).

NOTE: Metered-dose inhaler (MDI) route is preferred over nebulized route unless patient is requiring oxygen via mask or if the symptoms do not support use of an MDI with a mask or spacer (e.g. increased shortness of breath). Use MDI with spacer with mask if under 5 years of age or mouthpiece if 5 years of age or above if appropriate (e.g. able to follow instructions to utilize the equipment).

8. **For PRAM scores 8-12 or impending respiratory failure, notify MRP immediately and obtain orders to initiate severe asthma pathway**
9. As per assessment frequency indicated by PRAM score algorithm (See Appendix C), perform PRAM assessment post initial treatment.

Expected Client/Client/Resident Outcomes

1. Reassessment includes: SpO_2, RR, HR, accessory muscle use, work of breathing, and auscultation
2. Good response is indicated by the following:
   - →PEFR as per chart
   - →SpO_2 greater than 92%
   - →no distress
   - →respirations are normal
   - →minimal wheeze
   - →free of suprasternal retraction and scalene contraction
   - →colour improved
   - →anxiety managed

Response is to be sustained for 60 minutes

Client/Caregiver Education

- Proper technique for use of MDI and spacer:
  - Spacer with Mask (suggested for infant and child less than 5 years of age)
  - Spacer with Mouthpiece (suggested for child 4 years of age and up)
- Self-management techniques:
  - Asthma care
  - Asthma care in community settings
- Development of a personalized asthma action plan which includes
  - Identify triggers related to loss of asthma control

- Recognizing loss of asthma control
- Actions to take if asthma control deteriorates

Documentation

- As per site documentation practices
- NIA documentation (in the 'Orders' section of the client chart) – should be in accordance with Health Authority NIA policies:
  - **VPP:** Nurse Independent Activities (NIA) and Nurse Initiated Protocols
- Document medication administration as per unit and site practices.
- Document the PRAM score on the PRAM Documentation Sheet

Related Documents

- Staff education on metered dose inhaler (MDI) use
- Child Health BC Provincial Asthma Guidelines – Initial management of Pediatric Asthma in Emergent/Urgent Care Settings, Background and Evidence
- Child Health BC Provincial Asthma Guidelines – Initial management of Pediatric Asthma in Emergent/Urgent Care Settings, Practical Summary and Tools
- Child Health BC Provincial Asthma Guidelines – Initial management of Pediatric Asthma in Emergent/Urgent Care Settings, PRAM Table

VCH-PHC:

- VCH-PHC Practice Alert – VID-19 and Aerosol Generating Medical Procedures (AGMP)

VCH:

- VCH-PHC IPAC Guidelines Contact and Droplet Precautions

PHC:

- Droplet and Contact Precautions

References

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2. British Columbia, Ministry of Health (2015). Asthma in Adults – Recognition, diagnosis and management, *BCGuidelines.ca.* http://www2.gov.bc.ca/gov/content/health/practitioner-professional-resources/bc-guidelines/asthma-adults
3. Burns, D. (2013). Managing Acute Asthma in Primary Care. *Nursing Times 109*(42), 17-20. https://www.nursingtimes.net/clinical-archive/respiratory/managing-acute-asthma-in-primary-care/5064454.article
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5. Fraser Health Authority (2006). Emergency Asthma: Adult documentation tool for CTAS level 2 and 3. http://fhpulse/clinical_programs/emergency/resources/Asthma%20Protocol/chilliwack%20asthma%20adult%20dcoumentation.doc
6. Hodder, R.M., Lougheed, M.D., Rowe, B.H.,FitzGerald, J.M., Kaplan, A.G. & McIvor, R.A. (2010). Management of acute asthma in adults in the emergency department: non-ventilatory management. *Canadian Medical Association (182)* 2, E55-67. Retrieved from: http://www.cmaj.ca/content/182/2/E55.full.pdf+html
7. Winnipeg Regional Health Authority. (2010). Primary Care & Operational Guidelines: Emergency management of asthma in the primary care setting. http://www.wrha.mb.ca/professionals/familyphysicians/files/PCPG5.pdf
8. Winnipeg Regional Health Authority. (2010). Primary Care & Operational Guidelines: Appendix A: Treatment guidelines for asthma. http://www.wrha.mb.ca/professionals/familyphysicians/files/QRDocAsthma2010.pdf
9. Child Health BC (2018). Provincial Asthma Guidelines: Initial Management of Pediatric Asthma in Emergent/Urgent Care Settings – Background and Evidence. Retrieved from: https://childhealthbc.ca/sites/default/files/chbc_provincial_asthma_guideline_pram_table_march_2018.pdf

Appendix A: PEF Predicted Rates

PEAK EXPIRATORY FLOW RATE PREDICTED FOR MALES AND FEMALES

Height (cm)	Males and female	Height (cm)	Males and female
109	147	140	307
112	160	142	320
114	173	145	334
117	187	147	347
119	200	150	360
122	214	152	373
124	227	155	387
127	240	157	400
130	254	160	413
132	267	163	427
135	280	165	440
137	293	168	454

Reference: AirLife AsthmaCheck peak flow meter manual

Appendix B: PRAM Score

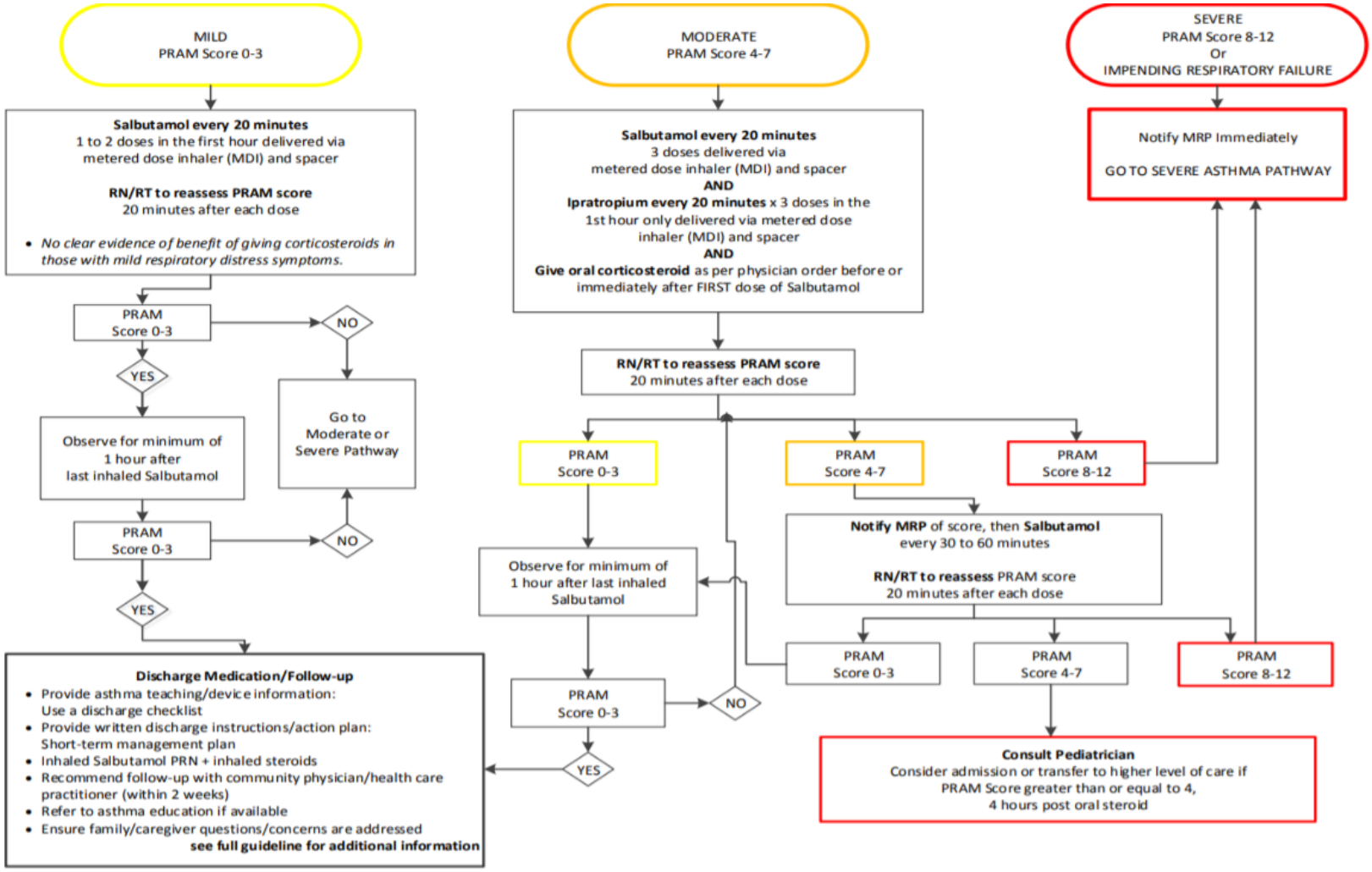
Asthma Clinical Score (PRAM): Mild, Moderate, Severe or Impending Respiratory Failure

Signs	0	1	2	3
Suprasternal Retractions	Absent		Present	
Scalene Muscle Contractions	Absent		Present	
Wheezing	Absent	Expiratory only	Inspiratory and expiratory	Audible without stethoscope/silent chest with minimal air entry
Air entry/Breath Sounds Intensity	Normal	Decreased at bases	Widespread decrease	Absent/minimal
Oxygen saturation On room air	Greater than or equal to 95%	92-94%	Less than 92%	

Severity Classification	PRAM Clinical Score
Mild	0-3
Moderate	4-7
Severe	8-12
Impending Respiratory Failure	Regardless of score, presence of lethargy, cyanosis, decreasing respiratory effort, and/or rising CO2

PRAM Score: From Child Health BC Provincial Asthma Guideline June 25, 2020

Appendix C: Pediatric Asthma (1-16.99 years) Initial Management Pathway in an Emergency Setting



PRAM Algorithm: From Child Health BC Provincial Asthma Guideline June 25, 2020

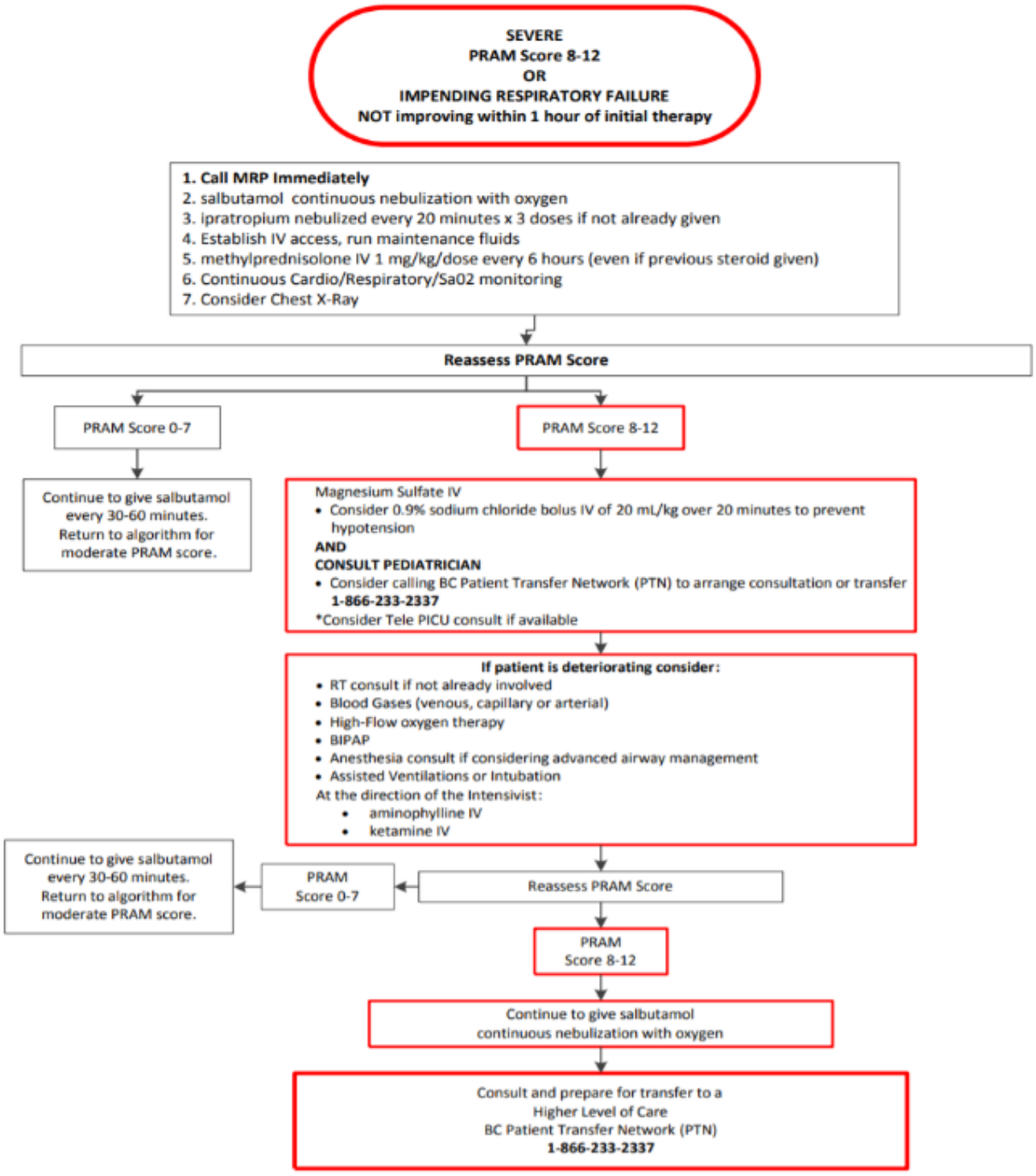
Appendix D: Medication Dosage

- This NIA only allows for independent administration of salbutamol and ipratropium
  - All other medications stated below require a provider order.
- 1 dose = number of puffs indicated in the chart below

Dose References	
salbutamol: **Less than 20 kgs:** 5 puffs by Metered-Dose Inhaler (MDI) and Spacer Or 2.5 mg by nebulizer **20 kgs or Greater:** 10 puffs by MDI and Spacer Or 5 mg by nebulizer ipratropium: **Less than 20 kgs:** 3 puffs by MDI Spacer Or 250 mcg by nebulizer **20 kgs or Greater:** 6 puffs by MDI and Spacer Or 500 mcg by nebulizer	dexamethasone: 0.3 to 0.6 mg/kg/dose (max dose 16 mg per dose) PO daily x 1-2 days prednisone/prednisolone: 1-2 mg/kg/dose (max dose 60 mg per dose) PO daily x 5 days methylprednisolone: 1 mg/kg/dose (max dose 60 mg per dose) IV q 6 hours magnesium sulfate: 40 to 50 mg/kg/dose (max dose 2 g per dose) IV x 1 dose over 20 minutes ***Avoid** in children with neuromuscular disease* sodium chloride: 0.9% 20 mL/kg bolus IV (over 15 to 30 minutes)

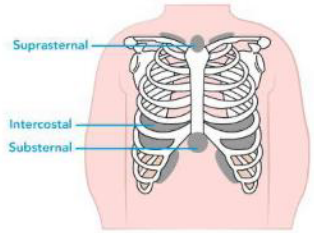
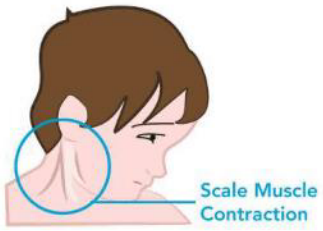
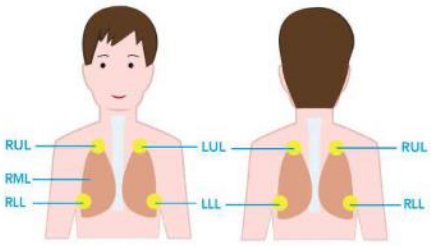
Medication Dosage: From Child Health BC Provincial Asthma Guideline June 25, 2020

Appendix E: Severe Asthma Pathway



Severe Asthma Pathway. From Child Health BC Provincial Asthma Guideline June 25, 2020

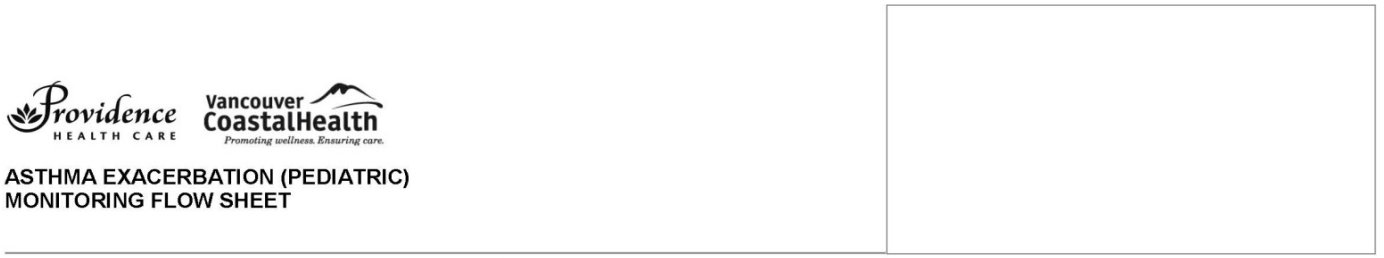
Appendix F: PRAM Scoring Table

Table 1: PRAM Scoring Table			
Criterions	**Description**	**Score**	**Notes**
O2 saturation	Greater than or equal to 95% 92-94% Less than 92%	0 1 2	O2 saturation must be measured with the patient breathing ambient air until stabilization of the oximetry value for at least 1 minute **Turn Off Supplementary Oxygen** when measuring PRAM. If SpO2 falls to less than 92% you can turn oxygen back on immediately as they have automatically scored maximum (2) points.
Suprasternal Retraction 	Absent Present	0 2	The suprasternal retraction is visible indrawing of the skin above the sternum and between the sterno-cleido-mastoid muscle with every intake of breath. **This is a visual assessment**
Scalene Muscle Contraction 	Absent Present	0 2	The scalenes are deep cervical muscles located in the floor of the lateral aspect of the neck Scalene contraction cannot be seen. **This is a palpable assessment.** Land mark for locating scalene muscles in the triangle bordered by the clavicle (in the front), the trapezius (in the back) and neck (medially) in the line with the ear lobe.
Air Entry 	Normal ↓ at the base ↓ at the apex and the base Minimal or absent	0 1 2 3	****In cases of asymmetry, the most severely affected lung field determines the rating.** Use lung fields to grade air entry. **Lung field=two contiguous VERTICAL auscultation zones of the major lobes:** Right anterior lung field: RUL & RML Right posterior lung field: RUL & RLL Left anterior lung field: LUL & LLL Left posterior lung field: LUL & LLL
Wheezing	Absent Expiratory only Inspiratory (± expiratory) Audible without stethoscope or silent chest (minimal or no air entry)	0 1 2 3	Use auscultation zones to grade wheeze **At least two auscultation zones must be affected to influence the rating.** **In case of asymmetry, the two most severely affected auscultation zones, irrespectively of their location (RUL, RML, RLL, LUL, LLL), will determine the rating criterion.
PRAM Score Total	**0 – 3 Mild**	**4 – 7 Moderate**	**8 – 12 Severe**

PRAM Scoring Table. From Child Health BC Provincial Asthma Guideline June 25, 2020

Appendix G: PRAM Documentation Record

- Please print form from above link.



ASTHMA EXACERBATION (PEDIATRIC)
MONITORING FLOW SHEET

PRAM clinical score	Severity Classification
0 to 3	Mild
4 to 7	Moderate
8 to 12	Severe
Regardless of score: lethargy, cyanosis, decreasing respiratory effort and/or rising pCO_2	Impending respiratory failure

Date:_____
Weight: _____ kg Height: _____ cm
Baseline PEFR Personal Best /Predicted = _____ L/min
PEF 80% of Personal Best /Predicted = _____ L/min

	VITALS						PEFR	Pediatric Respiratory Assessment Measure (PRAM)											
								Oxygen saturation on room air		Air entry		Wheezing		Suprasternal retractions		Scalene muscle contraction		PRAM score total	Initials
	Time	Temp	Heart rate	BP	Resp rate	SpO_2		Greater than or equal to 95%	0	Normal	0	Absent	0	Absent	0	Absent	0		
								92 to 94%	1	Decreased at the base	1	Expiratory only	1						
								Less than 92%	2	Decreased at the apex and the base	2	Inspiratory (+/- expiratory)	2	Present	2	Present	2		
										Minimal or absent	3	Audible without stethoscope or silent chest (minimal or no air entry)	3						
Pre-Initial Treatment																			
at 20 mins																			
at 40 mins																			
at 60 mins																			

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