

Caring for the Child with Asthma



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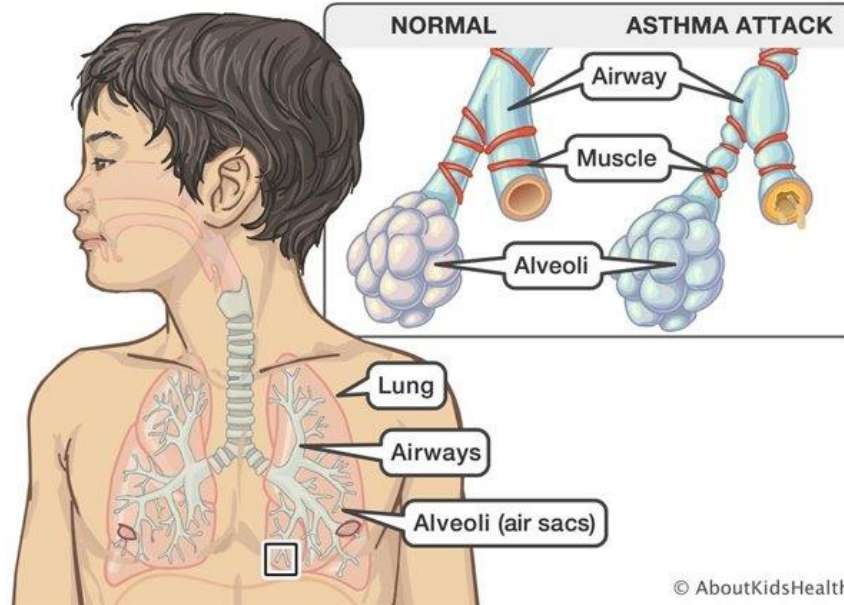
Tell us about yourself

Objectives

1. To review the basics of asthma and asthma exacerbation
2. To expand competencies in respiratory assessment in the context of an asthma exacerbation
3. To build competencies in managing asthma exacerbation using guidelines provided by the Lung Health Foundation
4. To review common asthma medications and best practices of administering medications via inhalations
5. To identify the key components of discharge teaching
6. To review the resources available to our community partners, caregivers and patients

What is Asthma?

A chronic condition that affects the airways. A child with asthma will experience narrowing of the airways when triggered by certain conditions, and this can lead to difficulty in breathing. This is known as an asthma exacerbation.



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Meet Daniel....



Daniel is a 2.5 year old is an otherwise healthy child who presents to the ED with a 2 day history of cough and runny nose. In the past 24 hours, the caregiver reports that they are "not themselves" and are having "a hard time breathing and is waking up at night". They have had an "on and off" cold for almost 4 weeks and "coughs hard at night". Upon arrival they have severe work of breathing, an expiratory and inspiratory wheeze, with diminished airway bilaterally to the bases.

What to include in a Medical History?

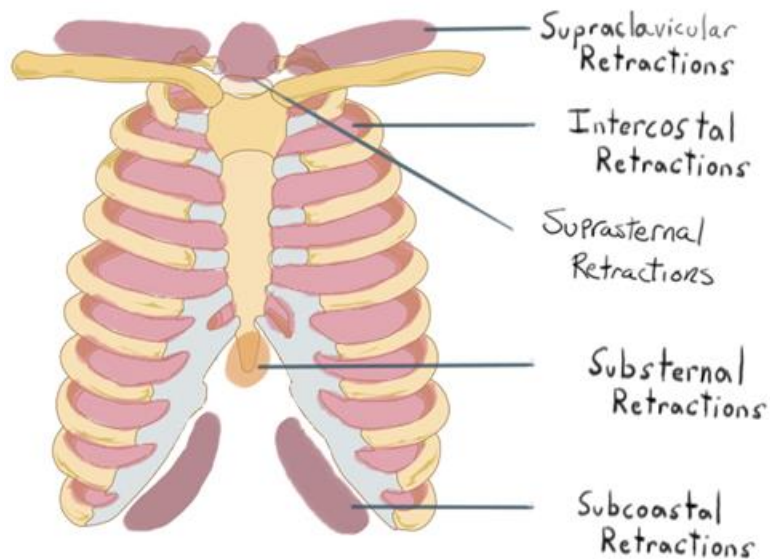
What should be included in

- Onset of exacerbation & potential triggers
- Severity of symptoms compared to previous exacerbations
- Response to treatments prior to presenting to emergency department
- All current medication & last dose
- Last course of systemic steroids
- Estimated number of asthma related visits to pediatrician, hospital, and ICU admissions (need for intubation)
- Assessment of persistent symptoms (nighttime symptoms, exercise intolerance, etc.)
- Co-morbidities
- Exposure to smoking & pollutants
- Allergies
- Psychosocial assessment

What is your Assessment?



Pediatric Assessment Triangle: Work of Breathing



Primary Assessment

A Airway

B Breathing

C Circulation

D Disability or neurologic status

E Expose & environmental control to prevent heat loss

What does Daniel's **Airway** sound like?



Lungs Sounds of
Asthma



Primary Assessment of Daniel's **Circulation & Disability**

Awake and Alert

Verbal

Pain

Unresponsive



Primary Assessment of **Exposure & Environmental Control**

- Expose chest for signs of increased WOB
- Examine and assess for additional signs to indicate it may not be asthma. Consider potential for foreign body or anaphylaxis
- Examine skin for rashes, swelling, or discoloration

What are your priorities? Next steps?

Interventions to correct any life-threatening conditions must be performed before further assessment is continued

Oxygen

**Choosing
Wisely
Canada**



Administer oxygen if patient's saturation is *consistently* below 88% on room air when asleep OR below 90% when awake

Don't use continuous pulse oximetry routinely in children hospitalized with acute respiratory illness unless they are on supplemental oxygen.

Note: As per the Lung Health Foundation, administer oxygen as required to keep $SpO_2 \geq 92\%$

Pediatric Respiratory Assessment Measure (PRAM) (Lung Health Foundation, 2021)

PRAM SCORING TABLE

Criteria	Description	Score	
O₂ 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	
	Minimal or absent	3	
Wheezing †	Absent	0	
	Expiratory only	1	
	Inspiratory (± expiratory)	2	
	Audible without stethoscope or silent chest (minimal or no air entry)	3	
PRAM score : (max. 12)			
Score	0-3	4-7	8-12
Severity	Mild	Moderate	Severe

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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

Pediatric Asthma Clinical Pathway (Lung Health Foundation, 2021)

Indications to start Pediatric Asthma Clinical Pathway

- Age 1-17 years with wheeze and/or cough AND asthma diagnosis and/or 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.

What is Daniel's PRAM Score?



Based on your PAT and Primary Assessments, he presents with:

- O₂ saturation on room air is 91%
- Suprasternal retraction (indrawing)
- Scalene muscle contraction
- Air entry decreased to RML, RLL, LUL, LLL
- Wheeze audible without stethoscope

PRAM SCORING TABLE

Criteria	Description	Score	
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	
	Minimal or absent	3	
Wheezing [‡]	Absent	0	
	Expiratory only	1	
	Inspiratory (± expiratory)	2	
	Audible without stethoscope or silent chest (minimal or no air entry)	3	
PRAM score : (max. 12)			
Score	0-3	4-7	8-12
Severity	Mild	Moderate	Severe

Daniel's PRAM Score is **11**

What are the next steps in managing **Severe Asthma**?

Pediatric Asthma Clinical Pathway

Severe Asthma Management: Key Points

- Early assessment by a physician
- Frequent re-assessments by RN
- Administration of "Back-to-Back" Salbutamol & Ipratropium Bromide NOW
- STAT oral corticosteroids
- Absence of wheeze vs silent chest
- Contingency planning for *Impending Respiratory Failure*: IV Access and Blood Gases
- Early recognition of *Impending Respiratory Failure* & urgent escalation of concerns

Impending Respiratory Failure

S/S:

- Lethargy
- Cyanosis
- Decreasing respiratory effort
- Rising pCO₂

AND/OR

Poor response to interventions (PRAM unchanged or less than 3-point improvement)

After the "Back to Back" Salbutamol, what is Daniel's PRAM Score?



O₂ saturation on room air is 94%
 Suprasternal retraction (indrawing)
 Air entry decreased to RLL & LLL
 Expiratory wheeze only

PRAM SCORING TABLE

Criteria	Description	Score	
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	
	Minimal or absent	3	
Wheezing [§]	Absent	0	
	Expiratory only	1	
	Inspiratory (± expiratory)	2	
	Audible without stethoscope or silent chest (minimal or no air entry)	3	
PRAM score : (max. 12)			
Score	0-3	4-7	8-12
Severity	Mild	Moderate	Severe

Daniel's PRAM Score is **5**

Moderate Asthma Management: Key Points

Pediatric Asthma Clinical Pathway

After sometime, what is Daniel's PRAM Score?



O₂ saturation on room air is 95%
 Air entry decreased to RLL & LLL
 Occasional expiratory wheeze only

PRAM SCORING TABLE

Criteria	Description	Score	
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	
	Minimal or absent	3	
Wheezing [§]	Absent	0	
	Expiratory only	1	
	Inspiratory (± expiratory)	2	
	Audible without stethoscope or silent chest (minimal or no air entry)	3	
PRAM score : (max. 12)			
Score	0-3	4-7	8-12
Severity	Mild	Moderate	Severe

Daniel's PRAM Score is **2**

Mild Asthma Management: Key Points

Pediatric Asthma Clinical Pathway

Discharge Readiness

Assess readiness for discharge if:

Child has mild presentation

and

Inhaled Salbutamol is q4h X 2

and

Discharge teaching was completed and *successful*

Discharge Teaching



The caregiver had reported that they have never been admitted to the hospital, but have visited their pediatrician at least 5 times this year with the same reported symptoms. On their last visit they were told Daniel may have "Reactive Airway Disease". They were given a blue puffer to be used when needed and an orange puffer. They stopped using the puffer 8 days later because he "sounded better". They think the puffer maybe empty and have not replaced it. Upon demonstration of administering puffs, the caregiver missed a few key steps: shaking the canister and allowing time between puffs.

What are the key teaching points?

Discharge Teaching Guidelines

Starts on Day 0

- ✓ Review of all medications: systemic steroids, controllers and relievers
- ✓ Provide instructions and demonstrations on how to administer inhaled medications (multi-modes: verbal, visual and/or written)
- ✓ Review when to replace MDI dose and spacer/mask maintenance
- ✓ Return demonstration by caregiver and/or patient of administering medications using an MDI (at least three times)
- ✓ Review of the Asthma Action Plan: what interventions and actions are required by the caregiver based on their child's signs & symptoms

Discharge Instructions

- ✓ Salbutamol inhaler Q4H x 24 hours; then as needed Q4H PRN
- ✓ Initiate/resume inhaled corticosteroids (e.g. Fluticasone) for 12 weeks (in total)
- ✓ Complete systemic steroid course (total 2 days Dexamethasone or 5 days Prednisone/ Prednisolone)
- ✓ Review Pediatric Asthma Action Plan
- ✓ Completion of Asthma Teaching
- ✓ Ensure family knows to see primary care physician within 72 hours of discharge for re-assessment
- ✓ Referral to an Asthma Clinic
- ✓ Referral for outpatient spirometry is recommended for all children ≥ 6 yrs in order to support diagnosis and to monitor asthma control

Overview of Asthma Medications

Magnesium Sulfate

- Consider for Severe or Impending Respiratory Failure
- 50 mg/kg/dose IV x 1 (max 2 g/dose), give over 20-30 min
- Requires cardiorespiratory monitoring and frequent BP checks (can cause hypotension)

Corticosteroids

- Recommended for Moderate to Severe PRAM Score
- Necessary to reduce inflammation during and immediately after an asthma exacerbation

PO Dexamethasone 0.6 mg/kg/dose x 1 (max 12 mg/dose)

PO Prednisone/prednisolone 2 mg/kg/dose x 1 (max 50 mg/dose)

*IV Or IM Hydrocortisone sodium succinate 8 mg/kg/dose IV or IM (max 400 mg/dose) x1, then 5 mg/kg/dose (max 400 mg/dose) q6h * If not responding or unable to tolerate PO*

INH Fluticasone propionate (Flovent): Patients presenting with first asthma exacerbation, and not previously on maintenance inhaled corticosteroid (ICS) therapy; High doses are not recommended beyond 14 days unless under the care of an asthma specialist due to the risk of adrenal insufficiency

Bronchodilators

- Opens up the medium and large airways of the lungs by relaxing muscles
- Salbutamol (Ventolin) & Ipratropium Bromide (Atrovent)
- Salbutamol may be referred to as "blue puffer" or "reliever"
Fluticasone Propionate may be referred to as the "orange puffer" or "controller"
- Administration via MDI and age appropriate valved spacer is preferred because of increased efficiency and decreased side effects (tachycardia, tremor and decreased risk of transmission of respiratory infections)

*Consider nebulized if in requiring oxygen, if patient has a Severe Score or Impending Respiratory Failure

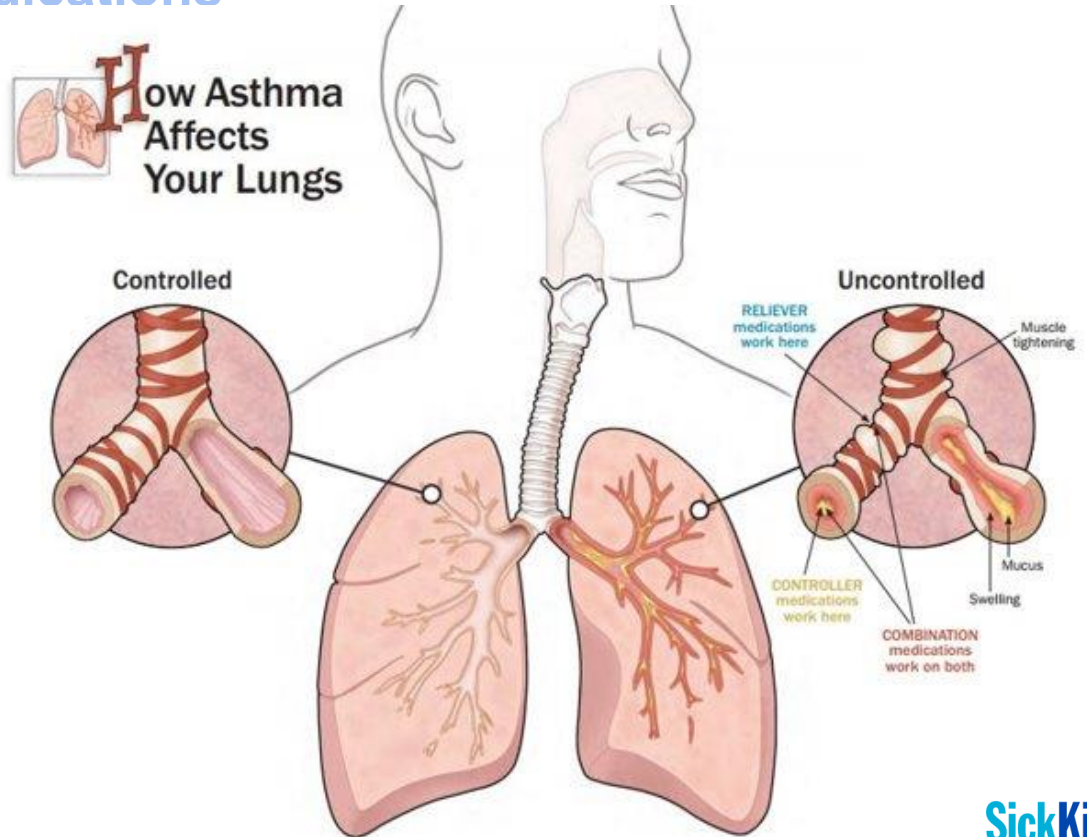
Reliever vs. Controller Medications

Reliever medicines: used for quick relief during an asthma episode or when experiencing symptoms, onset 15-30 minutes

i.e. Salbutamol (Ventolin)

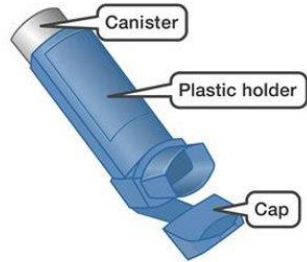
Controller medicines: used long term to help control inflammation, usually taken once a day even when well for a period of time

i.e. Fluticasone propionate (Flovent)



Medication Administration: Choosing the Right Spacer Device

MDI



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Spacer with Mouthpiece



Spacer with Mask

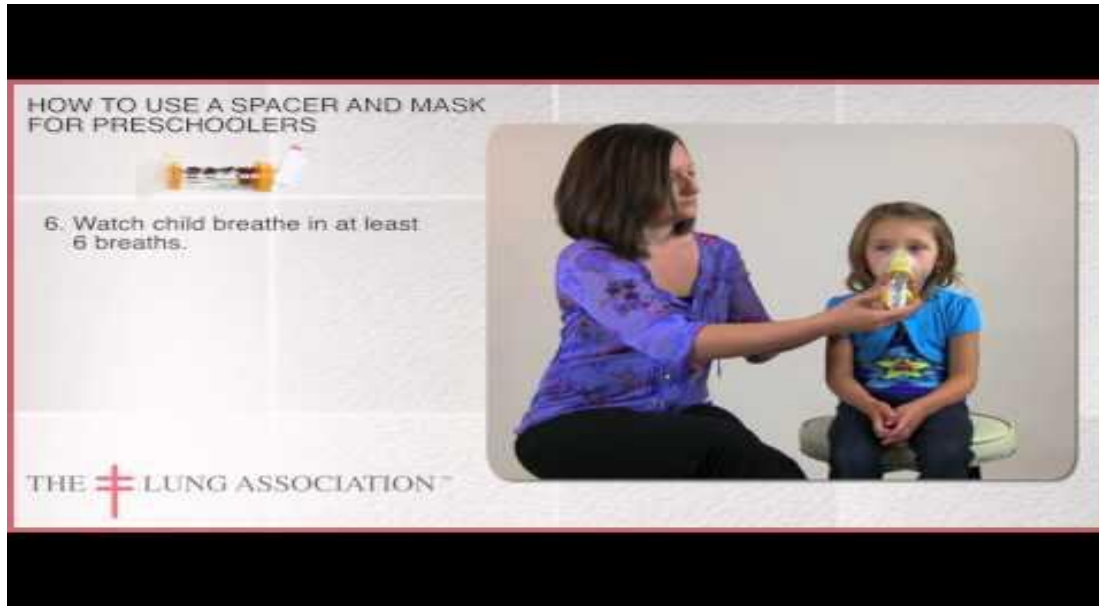


Spacer with Mask vs. Spacer with Mouthpiece

When available, all children should be given a spacer. Why?

- Ability to follow directions
- Ability to coordinate breathing
- Ability to take deep breaths
- Ability to form tight seal
- Nose vs. mouth breathing
- Tidal breathing vs. Single breath hold
- Transitions to mouthpiece can be difficult

How to Administer Inhaled Medications via MDI



AboutKidsHealth Tip Sheets for Caregivers & Patients:

- [Using a MDI without a Spacer](#)
- [Using a MDI with a Spacer](#)

MDI Use: Key Principles Regardless of Device

- ✓ Employ developmental approaches
- ✓ Have child sit up or in semi-recline whenever possible. If asleep, use clinical judgement.
- ✓ If unable to take breaths with ease, consider nebulized medication
- ✓ If on oxygen, consider using nebulized so they can continue to receive oxygen OR remove oxygen (nasal canula) while administering medications
- ✓ Before delivering each puff, shake MDI 5 times to ensure contents are evenly mixed.
- ✓ When possible, have patient exhale completely before putting spacer in their mouth or mask on face
- ✓ Only give 1 puff at a time.
- ✓ Wait 30 to 60 seconds in between puffs
- ✓ Rinse mouth with water and wipe face after use
- ✓ Always have families do a return demonstration and practice their technique as soon as possible and throughout admission.

When to replace an MDI

Dose counting is the only accurate way of knowing how many doses remain in an MDI

Resources

[AboutKidsHealth](#)

Clinical handbook for Paediatric Asthma (November 2021). Lung Health Foundation and Provincial Council for Maternal and Child Health. Accessible at:

https://www.health.gov.on.ca/en/pro/programs/ecfa/docs/hb_paediatric_asthma.pdf

[Connected Care](#)

Ducharme, F.M., Dell, S.D., Radhakrishnan, D, Grad, R.M., Watson, W., Yang, C.L., & Zellman, M. (2015). Diagnosis and management of asthma in preschoolers: a position paper. *Canadian Respiratory Journal*, 22(3), 135-143, Retrieved: <https://cps.ca/en/documents/position/asthma-in-preschoolers>

Trottier, E.D, Chan, K., Allain, D., & Chauvin-Kimoff, L. (2021). Managing an acute asthma exacerbation in children. *Canadian Paediatric Society*, Retrieved: <https://cps.ca/en/documents/position/managing-an-acute-asthma-exacerbation>

Available upon request: SickKids Inpatient Asthma Exacerbation Management Pathway



Online evaluation form will be sent after the session or scan the QR Code to complete now.

We appreciate your feedback.

<https://skconnect.typeform.com/to/jmP9E8IZ>