Pediatric Asthma Exacerbation Pathway in the Emergency Department

The following information is intended as a guideline for the acute management of children with asthma.
Management of your patient may require a more individualized approach

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Inclusion Criteria: 2 yo or greater with hx of asthma or recurrent wheezing presenting with acute onset wheezing, cough, shortness of breath, hypoxemia, tachypnea, or other signs of increased work of breathing

Exclusion Criteria: < 2 yo, diagnosed with viral bronchiolitis or croup, history of Cystic Fibrosis, Chronic Lung Disease, Cardiac Disease, or known Airway Anomalies

1. Obtain oxygen saturation and perform vital signs
2. Identify risk factors: Previous intubation or ICU admission, 2+ admissions in past year, 3+ ED visits in past year, Prior ED/ admission in last month, >2 inhalers of albuterol per month, poor perception of symptoms

1. Apply continuous cardio-pulmonary monitors and pulse oximetry. Administer O2 as needed to keep sat goal > 92%
2. Nurse to calculate **Pediatric Asthma Score (PAS) [SEE FOLLOWING PAGE FOR SCORING CRITERIA]**
3. Notify provider of PAS and utilize Pediatric Asthma Order Set based on PAS
4. Administer Corticosteroids* PAS of 3 or greater (search **ED PED Asthma Wheezing Order Set** --> **Meds**--> **Asthma (UNC)**)

* Seek medical direction for scores 0-2

1st Hour of Treatment

Mild Distress = PAS 1-2

- (< 20 kg) **Albuterol MDI 4 puffs**
- (≥ 20 kg) **Albuterol MDI 4-8 puffs**

  Alternative:
  - (< 20 kg) **Albuterol neb 2.5 mg**
  - (≥ 20 kg) **Albuterol neb 5 mg**
- Consider oral steroids
- Repeat PAS 15 min after treatment (preferably by same provider)
- May repeat at provider's discretion

Moderate Distress = PAS 3-5

- (< 20 kg) **Albuterol MDI 4 puffs**
- (≥ 20 kg) **Albuterol MDI 4-8 puffs**

  Alternative:
  - (< 20 kg) **Albuterol neb 2.5 mg** with **ipratropium 0.25 mg neb**
  - (≥ 20 kg) **Albuterol neb 5 mg** with **ipratropium 0.5 mg neb**
- **Administer oral steroids**
- Repeat PAS 15 min after treatment (preferably by same provider)

Severe Distress = PAS 6-10

- **Albuterol 20 mg/hr continuously for 1 hour**
- Perform & document **PAS every 15 min**

  Alternative:
  - (< 20 kg) **Albuterol neb 2.5 mg *with* ipratropium 0.25 mg Aerogen neb ****
  - (≥ 20 kg) **Albuterol neb 5 mg *with* ipratropium 0.5 mg Aerogen neb ****

  ** May repeat up to 3 total doses in first hr**
- **Administer steroids** and strongly consider adjunct therapy (Magnesium, IM Epi, etc.)
- Repeat PAS 15 min after **each** treatment (same provider)

Reassess PAS 1 hour post initial treatment

Mild Distress = PAS 1-2

- (< 20 kg) **Albuterol MDI 4 puffs**
- (≥ 20 kg) **Albuterol MDI 4-8 puffs**

  Alternative:
  - (< 20 kg) **Albuterol neb 2.5 mg**
  - (≥ 20 kg) **Albuterol neb 5 mg**
- Consider oral steroids
- Repeat PAS 15 min after treatment (preferably by same provider)

Moderate Distress = PAS 3-5

- **Ensure corticosteroids were delivered**
- (< 20 kg) **Albuterol MDI 4 puffs**
- (≥ 20 kg) **Albuterol MDI 4-8 puffs**

  Alternative:
  - (< 20 kg) **Albuterol neb 2.5 mg**
  - (≥ 20 kg) **Albuterol neb 5 mg**
- Repeat PAS 15 min after treatment (preferably by same provider)

Severe Distress = PAS 6-10

- **Ensure corticosteroids were delivered**
- **Albuterol 20 mg/hr continuously for 1 hour**
- Perform & document PAS every 15 min
- Repeat PAS 15 min after **each** treatment (preferably by same provider)
- Plan for admission -
  See **Symptoms Persist/ Patient Unstable below**

Calculate PAS hourly. Plan disposition at 2 hrs of presentation. DISPOSITION decision no later than 4 hrs.

HOURLY REASSESSMENT

DISPOSITION

Symptoms Resolve / Patient Stable - DISCHARGE

- Contact PCP for follow up
- Education regarding proper medication administration
- Rx for albuterol Q4 hours for cough or worsening sx
- Consider Rx for oral corticosteroids
- Consider maintenance therapy (inhaled corticosteroids)
- Provide patient with Asthma Action Plan

DISPOSITION

Symptoms Persist / Patient Unstable - ADMISSION

- Admit
  - Patients who continue to require continuous albuterol treatment (CAT) with **PAS of ≤ 6** can be admitted to **Intermediate Care Unit**
  - Patients who continue to require CAT with **PAS of ≥ 7** will likely need **PICU** admission
- Continue bronchodilator therapy
- Perform PAS prior to transfer to floor/ PICU
- Consider adjunct therapy (Mg [**50 - 75 mg/kg; max 2 g**], Heliox)
- Pulmonary/ PICU consult at discretion of PED attending

PEDIATRIC ASTHMA SCORE (PAS)

1. PAS should be done prior to treatment and repeated 15 minutes afterward (preferably by the same provider)
2. Add elements into a single score
3. Document score in Epic flowsheet and/or other areas of clinical documentation

ELEMENT		POINTS		
		0	1	2
1. Respiratory Rate Obtain over 30 sec and multiply by 2	**2 - 3 yrs**	**≤ 34**	**35-39**	**≥ 40**
	4 - 5 yrs	**≤ 30**	**31-35**	**≥ 36**
	6 - 11 yrs	**≤ 26**	**27-30**	**≥ 31**
	≥ 12 yrs	**≤ 23**	**24-27**	**≥ 28**
2. Ausculatation Auscultate anterior and posterior lung fields Assess air entry and presence of wheezing		**No Wheezes**	**Expiratory Wheezes**	**Inspiratory & expiratory wheezes OR diminished breath sounds**
3. Work of Breathing Assess for nasal flaring or retractions (suprasternal, intercostal, subcostal)		**≤ 1 sign**	**2 signs**	**≥ 3 signs**
4. Dyspnea * As developmentally appropriate. * If sleeping AND not showing physical signs of respiratory distress, sscore the patient zero for this category		**Speaks full sentences, playful, AND takes PO well**	**Speaks partial sentences, short cry OR poor PO**	**Speaks short phrases, grunting, OR unable to take PO**
5. O2 Requirement ** ** Do not take patients off supplemental oxygen to obtain score		**≥ 92% on RA**		**Supplemental oxygen required to maintain saturations above 92%**

Recommendations for Pediatric Patients with Severe Refractory Asthma in the ED

Indications / Definition:
PAS > 6 after completion of initial high dose albuterol treatment or worsening clinical symptoms after initial therapy, signs of impending respiratory failure (inability to speak, altered mental status, intercostal retractions, worsening fatigue)

Standard Therapies Initiated: High dose albuterol, ipratropium, steroids, and supplemental oxygen and IV fluids if indicated, monitoring
Maximum recommended dose of albuterol in 1 hour: 40 mg

Assess Resources and Call PICU for admission and/or consultation ⇨ Consider CXR ⇨ Proceed to Adjunct Therapies

Adjunct Therapies
Strongest Evidence of Benefit:
Magnesium sulfate (*50 - 75 mg/kg/dose IV, as a single dose, max 2g -- administer over 20 min*)
Systemic beta-agonists:
- IM EpiPen (**< 15 kg: 0.01 mg/kg/dose**; **15 kg to < 30 kg: 0.15 mg [EpiPen Jr]**; **≥ 30 kg= 0.3 mg [EpiPen]**)
- IV terbutaline (*2-10 mcg/kg IV bolus over 20 min, then drip 0.1 mcg/kg/min IV (starting dose)*)

Others Therapies to Consider:
Ketamine
Heliox (*80:20 -- if no supplemental oxygen requirement -- currently only available in the PICU*)
Non-invasive Positive Pressure Ventilation

Intubation -- *Only indicated for Apnea or Impending Arrest*