**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.

**Inclusion Criteria:** 2 y/o or greater with history of asthma or recurrent wheezing presenting with acute onset of wheezing, cough, dyspnea, hypoxia, tachypnea etc.

**Exclusion Criteria:** < 2 years of age, Diagnosed with viral bronchiolitis or croup, History of Cystic Fibrosis, Chronic Lung Disease, Cardiac Disease, Airway Anomalies

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1. **Measure oxygen saturation and vital signs.**
2. **Identify risk factors:** Previous intubation/ICU admission, 2+ admissions in past year, 3+ ED visits in last year, Prior ED/admission in last month, >2 canisters of SABA per month, poor perception of symptoms

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**1st Hour of Treatment**

- **Mild Distress = PAS 1-2**
  - (≤15kg) Albuterol MDI 4 puffs
  - (>15kg) Albuterol MDI 4-8 puffs
    - **Alternative:**
      - (≤15kg) Albuterol neb 2.5mg
      - (>15kg) Albuterol neb 5mg
      - Consider oral steroids
      - Repeat PAS 15 min after treatment (preferably by same provider)
      - May repeat at provider’s discretion

- **Moderate Distress = PAS 3-5**
  - (≤15kg) Albuterol MDI 4 puffs followed by ipratropium MDI 4 puffs **
  - (>15kg) Albuterol MDI 4-8 puffs followed by ipratropium MDI 4-8 puffs **
  - **May repeat up to 3 total doses in first hour**
    - **Alternative – may be repeated as above:**
      - (≤15kg) Albuterol neb 2.5mg with ipratropium 0.5mg neb
      - (>15kg) Albuterol neb 5mg with ipratropium 0.5mg neb
  - Repeat PAS 15 min after each treatment (preferably by same provider)

- **Severe Distress = PAS 6-10**
  - (≤15kg) Albuterol MDI 4 puffs followed by ipratropium MDI 4 puffs **
  - (>15kg) Albuterol MDI 4-8 puffs followed by ipratropium MDI 4-8 puffs **
  - **May repeat up to 3 total doses in first hour**
    - **Alternative – may be repeated as above:**
      - (≤15kg) Albuterol neb 2.5mg with ipratropium 0.5mg neb
      - (>15kg) Albuterol neb 5mg with ipratropium 0.5mg neb
  - Repeat PAS 15 min after each treatment (preferably by same provider)

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**Reassess PAS 1 hour post treatment.**

- **Mild Distress = PAS 1-2**
  - (≤15kg) Albuterol MDI 4 puffs
  - (>15kg) Albuterol MDI 4-8 puffs
    - **Alternative:**
      - (≤15kg) Albuterol neb 2.5mg
      - (>15kg) Albuterol neb 5mg
      - Consider oral steroids
      - Repeat PAS 15 min after treatment (preferably by same provider)

- **Moderate Distress = PAS 3-5**
  - Ensure corticosteroids were delivered
  - (≤15kg) Albuterol MDI 4 puffs
  - (>15kg) Albuterol MDI 4-8 puffs
    - **Alternative:**
      - (≤15kg) Albuterol 2.5mg neb
      - (>15kg) Albuterol 5mg neb
  - Repeat PAS 15 min after each treatment (preferably by same provider)

- **Severe Distress = PAS 6-10**
  - Ensure corticosteroids were delivered
  - Albuterol continuously (0.5 mg/kg/hr) – max of 20mg
  - Perform and document PAS every 15 min.
    - **Alternative:**
      - (≤15kg) Albuterol 2.5mg with ipratropium 0.5mg neb
      - (>15kg) Albuterol 5mg with ipratropium 0.5mg neb
      - Repeat PAS 15 min after each treatment (preferably by the same provider)

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**Hourly Reassessment**

- **Symptoms Resolve / Patient Stable - Discharge**
  - Contact PCP for follow up
  - Education regarding proper medication administration
  - Rx for albuterol Q4 hours for cough or worsening symptoms
  - Rx for oral corticosteroids for 3-10 days
  - Consider maintenance therapy (inhaled corticosteroids)
  - Provide patient with Asthma Action Plan

- **Symptoms Persist / Patient Unstable - Admission**
  - Admit – follow appropriate inpatient order set and flow sheet
  - Continue bronchodilators
  - Perform PAS prior to transfer to floor
  - Consider adjunct therapy (magnesium, Heliox)
  - Consider Pulmonary or PICU consult

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

<table>
<thead>
<tr>
<th>Element</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Respiratory Rate</strong> Obtain over 30 sec and multiple by 2.</td>
<td><strong>0</strong></td>
</tr>
<tr>
<td>2-3 yrs</td>
<td>≤34</td>
</tr>
<tr>
<td>4-5 yrs</td>
<td>≤30</td>
</tr>
<tr>
<td>6-11 yrs</td>
<td>≤26</td>
</tr>
<tr>
<td>≥12 yrs</td>
<td>≤23</td>
</tr>
<tr>
<td><strong>2. Auscultation</strong> Auscultate anterior and posterior lung fields. Assess air entry and presence of wheezing.</td>
<td>No Wheezes</td>
</tr>
<tr>
<td></td>
<td>≤1 sign</td>
</tr>
<tr>
<td><strong>3. Work of Breathing</strong> Assess for nasal flaring or retractions. (suprasternal, intercostal, subcostal)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>≤1 sign</td>
</tr>
<tr>
<td><strong>4. Dyspnea</strong>    As developmentally appropriate. *If sleeping AND not showing physical signs of respiratory distress, score the patient 0 (zero) for this category.</td>
<td>Speaks full sentences, playful, AND takes PO well</td>
</tr>
<tr>
<td><strong>5. O₂ Requirement</strong> <strong>Do not take patients off supplemental oxygen to obtain score.</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥92% on RA</td>
</tr>
</tbody>
</table>
Recommendations for 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 Consultation
- Consider Obtaining Chest X-ray

**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:
  - IV epinephrine (1:1000, 0.01mL/kg/dose IM/SC, max 0.3 mL)
  - IV terbutaline (2-10 mcg/kg IV bolus over 20 min, then drip 0.1 mcg/kg/min IV (starting dose))

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

**Intubation – Only Indicated for Apnea or Impending Arrest**