

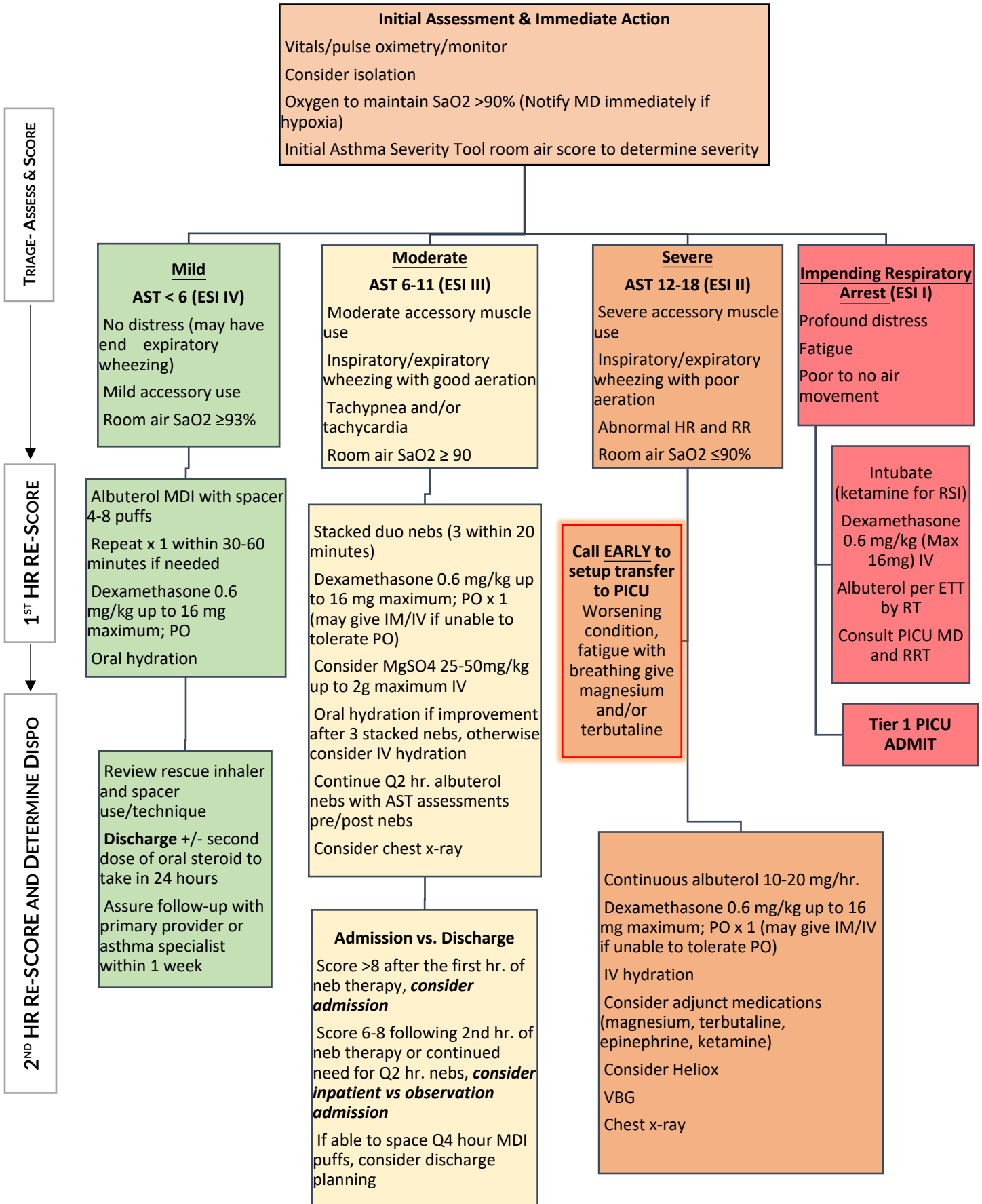
# Asthma Clinical Pathway

August 2021

<b>Outcomes/Goals</b>	<ol style="list-style-type: none"> <li>1. Early identification, classification and treatment of asthma using Asthma Severity Tool</li> <li>2. Standardize best practices for asthma treatment in the Emergency Department</li> </ol>								
<b>Inclusion Criteria</b>	Pediatric patients 2-19 years of age with a history of asthma								
<b>Exclusion Criteria</b>	<ul style="list-style-type: none"> <li>• Patients presenting with chief complaint of first-time wheezing, respiratory distress without history of asthma, and/or wheezing in children</li> <li>• Patients with chronic lung disease (e.g. CF)</li> <li>• Cardiac disease</li> </ul>								
<b>NURSE</b> Documentation	Chief complaint. Onset of symptoms. Asthma history, including use of peak flow, medications, last steroid use, recent illness, hospitalizations, PICU stays, intubation. General appearance, lung sounds, work of breathing, retractions, pulses, skin temperature/fever. Initial room air Asthma Severity Score. (See page 4 for Pediatric AST Severity Scale)								
<b>INTERVENTIONS</b> Initiate on arrival	<p>Determine severity of exacerbation (initial and rescoring is on room air)</p> <p>ESI Triage level II, III, or IV, depending on severity</p> <p>Evaluate need for isolation and initiate immediately if applicable</p> <p>Initiate Pediatric ED Order Set: ED PED ASTHMA (PO-7660)</p> <p>Full set of vitals per standard of care</p> <p>Continuous pulse oximetry if SaO<sub>2</sub> ≤ 95%</p> <p>Oxygen to maintain SaO<sub>2</sub> &gt; 90%</p> <p>Initiate Duo nebs for audible wheezing, retractions, or distress, and considering asthma history (consider initially using continuous albuterol for severe exacerbations)</p> <p>Administer continuous nebs with air, using oxygen as needed to maintain SaO<sub>2</sub> levels</p>								
<b>PHYSICIAN (LIP)</b>									
<b>Medication</b>  Bronchodilators	<p><b>Mild:</b> Albuterol inhaler with spacer 4-8 puffs, repeat x 1 within first 30-60 minutes if needed</p> <p><b>Moderate/Severe:</b> 3 stacked Duo nebs. Do not delay time between nebs &gt; 5 minutes, continue albuterol nebs Q 2-4 hours as needed</p> <p><b>Continuous Albuterol:</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #ffffcc;">Weight</th> <th style="background-color: #ffffcc;">Continuous Neb Dose</th> </tr> </thead> <tbody> <tr> <td>5-10 kg</td> <td>10 mg/hr.</td> </tr> <tr> <td>10-20 kg</td> <td>15 mg/hr.</td> </tr> <tr> <td>&gt;20 kg</td> <td>20 mg/hr.</td> </tr> </tbody> </table> <p>*Younger children may be dosed at 0.3-0.5 mg/kg/hr.</p>	Weight	Continuous Neb Dose	5-10 kg	10 mg/hr.	10-20 kg	15 mg/hr.	>20 kg	20 mg/hr.
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Steroids	Dexamethasone 0.6 mg/kg up to 16 mg max; PO x 1 (Use IV version orally to minimize volume) If unable to tolerate PO: Dexamethasone 0.6 mg/kg up to 16 mg max IM/IV (second dose of dexamethasone 24 hours after first dose)								
<b>Additional Medications</b>	<p>Additional medication <b>considerations</b> for severe exacerbation:</p> <ul style="list-style-type: none"> <li>• <b>Magnesium</b> 25-50 mg/kg (maximum 150 mg/min) x 1 over 15-30 minutes, may repeat x 2 doses up to 2 g total</li> <li>• <b>Terbutaline</b> 10 mcg/kg IV (loading dose) over 10 minutes, then infusion 0.1- 10 mcg/kg/min IV pending PICU admission **Can be given <b>SQ/IM</b> 0.005-0.01 mg/kg/dose – max 0.4 mg/dose every 15-20 minutes x 3 doses</li> <li>• <b>Epinephrine SQ/IM</b> 0.01 mg/kg 1:1000 maximum 0.5 mg every 20 minutes x 3 doses if refractory to all other methods</li> <li>• <b>Heliox</b> (80/20%) with albuterol via mask</li> </ul>								
<b>Rehydration</b>	Evaluate/encourage oral rehydration as appropriate Consider IV rehydration if unable to tolerate PO fluids or significantly increased WOB								
<b>Non-Invasive Ventilation</b>	<ul style="list-style-type: none"> <li>• <b>CPAP/BiPAP:</b> Use EPAP 5 cm H<sub>2</sub>O; IPAP 15 cm H<sub>2</sub>O as initial order; page RT</li> <li>• <b>High-Flow Nasal Cannula:</b> 21-100% humidified warmed oxygen. Flow based upon cannula size and work of breathing, though 1-2L/kg initiation recommended. Page RT.</li> </ul>								
<b>Rescue Medication</b>	<ul style="list-style-type: none"> <li>• <b>Consider Ketamine</b> Loading dose 0.3 to 0.5 mg/kg IV over 1-2 minutes followed by infusion of 0.3-0.5 mg/kg/hr IV</li> </ul>								

# Asthma Clinical Pathway

August 2021



## Asthma Rationale and Data

### Goals of Clinical Pathway

1. Early identification, classification and treatment of Asthma using Asthma Severity Tool
2. Standardize best practices for asthma treatment in the Emergency Department

Weaning from continuous Albuterol nebs: Do not stop continuous nebs abruptly unless patient is deteriorating or in respiratory failure. To wean continuous nebs decrease dose in half for one hour. If tolerated, stop continuous Albuterol and resume Q2 hour nebs per protocol.

Data Considerations	Interventions	Rationale
Steroids	Dexamethasone	<p>Two doses of oral dexamethasone is as effective as 5 days of oral prednisone in preventing relapse for pediatric asthma exacerbations and had better compliance</p> <p>Single dose oral Dexamethasone is as effective as 3-5 days of twice-daily prednisolone in the management of children with mild to moderate asthma Dexamethasone is well absorbed orally, has the same bioavailability as when given parenterally and duration of action lasting up to 72 hours after a single dose</p>
Inhaled Medications	Albuterol & Ipratropium (Duoneb)  Continuous Albuterol	<p>Treatment with combination albuterol ipratropium appears to reduce hospitalization compared to albuterol alone.</p> <p>Patients with severe respiratory distress have decreased rates of hospitalization and improvement in pulmonary function when treated with continuous Albuterol nebulizer</p>
Adjunct Medications	Magnesium	IV magnesium sulfate improves pulmonary function and prevents hospitalization
	Terbutaline	A trend toward improvement in clinical asthma severity score is seen with IV Terbutaline, but adverse effects may include cardiac dysrhythmias and elevated troponin
Rescue Medication	Ketamine	Ketamine IV bolus followed by a continuous infusion may have moderate benefits to standard therapy in children with moderately to severe asthma exacerbation

## Pediatric Asthma Severity Scoring Tool (AST)

Parameter	Severity Score			
	0	1	2	3
Room air SPO2	>95%	93-95%	90-92%	<90%
Accessory Muscle Use	None	Mild	Moderate	Severe
Inspiratory/Expiratory Ratio	2:1	1:1	1:2	1:3
Wheezing	None	End expiratory	Inspiratory and expiratory with good aeration	Inspiratory and expiratory with poor aeration
Heart Rate <3 years old	<120	120-140	141-160	>160
3 years old or older	<100	100-120	121-140	>140
Respiratory Rate < 6years old	<30	31-45	46-60	>60
6 years old or older	<20	21-35	36-50	>50

### **TOTAL SCORE:**

- **0-5 Mild** Consider Q4 hour treatment and Assessment after initial treatment and stabilization
- **6-11 Moderate** Consider Q2 hour treatment and Assessment after initial treatment and stabilization and admission/transfer
- **12-18 Severe** Consider early transfer, continuous nebs and adjunct medications

### **Citations:**

Griffiths B, Ducharme FM. Combined inhaled anticholinergics and short-acting beta2-agonists for initial treatment of acute asthma in children. Cochrane Database Syst Rev 2013; CD000060.

Keeney GE, Gray MP, Morrison AK, et al. Dexamethasone for acute asthma exacerbations in children: a meta-analysis. Pediatrics 2014; 133:493

Cronin JJ, McCoy S, Kennedy U, et al. A Randomized Trial of Single-Dose Oral Dexamethasone Versus Multidose Prednisolone for Acute Exacerbations of Asthma in Children Who Attend the Emergency Department. Ann Emerg Med 2016; 67:593

Zemek R, Plint A, Osmond MH, et al. Triage nurse initiation of corticosteroids in pediatric asthma is associated with improved emergency department efficiency. Pediatrics 2012; 129:671.

Cheuk DK, Chau TC, Lee SL. A meta-analysis on intravenous magnesium sulphate for treating acute asthma. Arch Dis Child 2005; 90:74

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Kim IK, Phrampus E, Venkataraman S, et al. Helium/oxygen-driven albuterol nebulization in the treatment of children with moderate to severe asthma exacerbations: a randomized, controlled trial. Pediatrics 2005; 116:1127.

Denmark TK, Crane HA, Brown L. Ketamine to avoid mechanical ventilation in severe pediatric asthma. J Emerg Med 2006; 30:163