Pediatric Asthma Emergency Management Plan

This plan is to be used for all acutely symptomatic asthma exacerbations.

Steps include:
1. Rapid categorization of severity based on presenting signs and symptoms.
2. Time based management dependent on severity.
3. Disposition based on response to prompt therapy.

The following tables will assist and guide assessment, treatment, and disposition decisions as well as define inpatient treatment options and potential drug toxicities.

Acute Asthma Severity Table

Signs and Symptoms	**CATEGORY**			
	Mild	**Moderate**	**Severe**	**Imminent Respiratory Failure**
Respiratory Rate	30% above mean	30-50% above mean	>50% above mean	>50% above mean, or very slow
Alertness	Normal	Usually agitated	Agitated	Drowsy, Confused
Dyspnea	Mild	Moderate	Severe	Severe
Color	Good	Pale	May be cyanotic	Cyanotic
Accessory muscle use	Mild	Moderate	Severe	Pardoxical thoracoabdominal movements
Auscultation	End-expiratory wheeze	Inspiratory and Expiratory wheezing	Inaudible wheezing	Inaudible wheezing, minimal breath sounds
PEFR (% of Predicted)	70-90%	50-70%	<50%	<20%
Air movement	Good	Fair	Poor	Poor/Absent
$PaCO_2$	< 35 mmHg	< 40 mmHg	> 40mm Hg	> 40mm Hg

(adapted from Guidelines for the Diagnosis and Management of Asthma, National Heart, Lung, and Blood Institute, NIH, Bethesda, Md., 9/1991. P.105., and VHA\DoD CPG 1996)

Acute Asthma Treatment Guide

<table>
<tr><th>Time Frame</th><th colspan="3">Category (Distress)</th></tr>
<tr><td></td><td colspan="2">Mild-Moderate</td><td>Severe</td></tr>
<tr><td>Presentation</td><td colspan="2">Vitals, Pulse Ox, Brief Hx and PE, with Supplemental O_2 given for Sat ≤ 90%, preferably keeping Sats ≥ 94%</td><td>Vitals, Pulse Ox, Brief Hx and PE, with Supplemental O_2 given for Sat ≤ 90%, preferably keeping Sats ≥ 94%</td></tr>
<tr><td rowspan="4">+10 to +20 minutes</td><td colspan="2">Immediate β-agonist (Albuterol)</td><td>Immediate β-agonist</td></tr>
<tr><td colspan="2"></td><td>Albuterol</td><td>Terbutaline</td></tr>
<tr><td>MDI with Spacer 4-8 puffs, reassess and repeat q10-20 minutes</td><td>Albuterol nebulized 2.5-5 mg reassess and repeat q10-20 minutes</td><td>Nebulized 2.5-5 mg, reassess and repeat q10-20 minutes, repeat back-to-back if necessary</td><td>SQ .01mg/kg if unresponsive to Albuterol or not moving air, may repeat in 15 minutes, max dose .4mg</td></tr>
<tr><td colspan="2">Consider adding Ipratroprium to subsequent neb .25-.5 mg</td><td colspan="2">Add Ipratroprium to subsequent nebs .25-.5 mg</td></tr>
<tr><td rowspan="2">+30 minutes</td><td colspan="2">Consider steroids</td><td colspan="2">Steroids</td></tr>
<tr><td>Oral Prednisone 2mg/kg if tolerating P.O.</td><td>Solumedrol IV or IM 2mg/kg if unable to tolerate P.O.</td><td colspan="2">Solumedrol IV 2-4 mg/kg IV and reassess</td></tr>
<tr><td>+ 60 minutes</td><td colspan="2">Consider $MgSO_4$ 30-70 mg/kg over 20 minutes and reassess</td><td colspan="2">$MgSO_4$ 30-70 mg/kg over 20 minutes and reassess, and continue nebs as necessary</td></tr>
<tr><td rowspan="2">+120 to +240</td><td colspan="2" rowspan="2">Patient may be discharged home if clinically improved with Sat ≥ 94%, and reliable follow-up established</td><td colspan="2">Admit if not improved</td></tr>
<tr><td>Ward ?</td><td>PICU ?</td></tr>
</table>

Asthma Inpatient Management Plan

<table>
<tr><td colspan="2">Admit to hospital if patient cannot take P.O. meds and fluids, maintain Saturation ≥ 94% on room air, or requires bronchodilators more frequent than every 3-4 hours, or for concern of rapid deterioration</td></tr>
<tr><td>Ward</td><td>PICU</td></tr>
<tr><td>If Sat ≥ 94% on ≤ 50% FIO_2, requires ≤ q2-3° Albuterol prn (MDI with Spacer or nebulized)</td><td>If remains in distress use Albuterol continuously .5mg/kg/hr (range 10-40 mg/hr) with O_2 to keep Sat ≥ 94% (Always use humidified O_2)</td></tr>
<tr><td>Use Prednisone 2 mg/kg/day or Solumedrol 2-4 mg/kg/day ÷ q6°</td><td>Use Terbutaline drip as adjunct , bolus with 10mcg /kg over 10 minutes the run drip .1mcg/kg/min titering q 15-30 min, up to max of 4 mcg/kg/min</td></tr>
<tr><td>Consider Ipratroprium neb 0.25-0.5 mg q 4-6°</td><td>Use Solumedrol 4 mg/kg/day ÷ q6°</td></tr>
<tr><td>Consider $MgSO_4$ 25-50mg/kg IV q6°</td><td>Ipratroprium neb 0.25-0.5 mg q 4-6°°</td></tr>
<tr><td>Consider temporary NPO status with maintenance IVF’s if in distress</td><td>Consider $MgSO_4$ 25-50mg/kg IV q6°</td></tr>
<tr><td rowspan="5">Discharge patient to home if clinically improved with Sat ≥ 94%, and reliable follow-up established</td><td>Consider temporary NPO status with maintenance IVF’s if in distress, especially if intubation a possibility</td></tr>
<tr><td>Other Options include:</td></tr>
<tr><td>Heliox 70:30</td></tr>
<tr><td>Consider Theophylline 6-7mg/kg bolus followed by drip
Must follow levels 30min post bolus and 12-24hr after initiation of drip</td></tr>
<tr><td>Ketamine sedation .5-1mg/kg/dose</td></tr>
<tr><td></td><td>Inhaled anesthetics</td></tr>
</table>

Asthma Medication Toxicity Profile

Medication	Toxicity
Albuterol	Tachycardia, hypokalemia, tremors
Ipratroprium	Dry mouth, Tachycardia, Dry secretions
Terbutaline	Tachycardia, arryhthmias, hypokalemia, muscle twitching, ⇑ muscle CPK
Steroids	Hyperglycemia, gastritis, CNS stimulation, hypertension, immune suppression
Magnesium	Hypotension, weakness, Nausea, Flushing
Theophylline	Tachycardia, nausea, ventricular dysrhythmias, tremors, seizures
Ketamine	Potent sialogogue, respiratory depression, emergence phenomena, tachyphylaxis
Heliox	Theoretical risk of atalectasis
Inhaled anesthetics	Hypotension, apnea, myocardial depression