Asthma Clinical Pathway				
	August 2021			
Outcomes/Goals	<ol> <li>Early identification, classification and treatment of asthma using Asthma Severity Tool</li> <li>Standardize best practices for asthma treatment in the Emergency Department</li> </ol>			
Inclusion Criteria	Pediatric patients 2-19 years of age with a history of asthma			
<b>Exclusion Criteria</b>	Patients presenting with chief complaint of first-time wheezing, respiratory distress			
	without history of asthma, and/or wheezing in children			
	Patients with chronic lung disease (e.g. CF)			
	Cardiac disease			
NURSE	Chief complaint. Onset of symptoms. Asthma history, including use of peak flow, medications,			
Documentation	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)			
INTERVENTIONS	Determine severity of exacerbation (initial and rescoring is on room air)			
Initiate on arrival	ESI Triage level II, III, or IV, depending on severity			
	Evaluate need for isolation and initiate immediately if applicable Initiate Pediatric ED Order Set: ED PED ASTHMA (PO-7660)			
	Full set of vitals per standard of care			
	Continuous pulse oximetry if SaO2 ≤ 95%			
	Oxygen to maintain SaO2 > 90%			
	Initiate Duo nebs for audible wheezing, retractions, or distress, and considering asthma history (consider initially using continuous albuterol for severe exacerbations)			
		g oxygen as needed to maintain SaO2 levels		
PHYSICIAN (LIP)	,	6 18		
Medication	Mild: Albuterol inhaler with spacer 4-8 puffs, repeat x 1 within first 30-60 minutes if needed			
	Moderate/Severe: 3 stacked Duo nebs. Do not delay time between nebs > 5 minutes, continual albuterol nebs Q 2-4 hours as needed			
Bronchodilators				
	Continuous Albuterol:			
	Weight	Continuous Neb Dose		
	5-10 kg	10 mg/hr.		
	10-20 kg	15 mg/hr.		
	>20 kg	20 mg/hr.		
Steroids	*Younger children may be dosed at 0.3-0.5 mg/kg/hr.			
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)	o. o mg/ kg up to 10 mg max m// w (second dose of		
Additional	Additional medication <b>considerations</b> for severe exacerbation:			
Medications	Magnesium 25-50 mg/kg (maximum 150 mg/min) x 1 over 15-30 minutes, may repeat x 2			
	doses up to 2 g total			
	• Terbutaline 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  • Enipophrine SQ/IM 0.01 mg/kg 1:1000 maximum 0.5 mg every 20 minutes x 3 doses if			
	• <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			
	Heliox (80/20%) with albuterol via materials.	ask		
Rehydration	Evaluate/encourage oral rehydration as appropriate			
	Consider IV rehydration if unable to tolerate PO fluids or significantly increased WOB			
Non-Invasive	• <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			
Ventilation	High-Flow Nasal Cannula: 21-100% humidified warmed oxygen. Flow based upon cannula size			
_	and work of breathing, though 1-2L/kg initiation recommended. Page RT.			
Rescue	• Consider Ketamine Loading dose 0.3 to 0.5 mg/kg IV over 1-2 minutes followed by infusion of			
Medication	0.3-0.5 mg/kg/hr IV			

# **Asthma Clinical Pathway**

August 2021

#### **Initial Assessment & Immediate Action**

Vitals/pulse oximetry/monitor

Consider isolation

Oxygen to maintain SaO2 >90% (Notify MD immediately if hypoxia)

Initial Asthma Severity Tool room air score to determine severity

#### Mild

### AST < 6 (ESI IV)

No distress (may have end expiratory wheezing)

Mild accessory use

Room air SaO2 ≥93%

Albuterol MDI with spacer 4-8 puffs

Repeat x 1 within 30-60 minutes if needed

Dexamethasone 0.6 mg/kg up to 16 mg maximum; PO

Oral hydration

Review rescue inhaler and spacer use/technique

Discharge +/- second dose of oral steroid to take in 24 hours

Assure follow-up with primary provider or asthma specialist within 1 week

# Moderate

#### AST 6-11 (ESI III)

Moderate accessory muscle use

Inspiratory/expiratory wheezing with good aeration

Tachypnea and/or tachycardia

Room air SaO2 ≥ 90

Stacked duo nebs (3 within 20 minutes)

Dexamethasone 0.6 mg/kg up to 16 mg maximum; PO x 1 (may give IM/IV if unable to tolerate PO)

Consider MgSO4 25-50mg/kg up to 2g maximum IV

Oral hydration if improvement after 3 stacked nebs, otherwise consider IV hydration

Continue Q2 hr. albuterol nebs with AST assessments pre/post nebs

Consider chest x-ray

#### Admission vs. Discharge

Score >8 after the first hr. of neb therapy, consider admission

Score 6-8 following 2nd hr. of neb therapy or continued need for Q2 hr. nebs, consider inpatient vs observation admission

If able to space Q4 hour MDI puffs, consider discharge planning

#### Severe

#### **AST 12-18 (ESI II)**

Severe accessory muscle use

Inspiratory/expiratory wheezing with poor aeration

Abnormal HR and RR Room air SaO2 ≤90%

**Call EARLY to** 

setup transfer

to PICU

Worsening

condition,

fatigue with

breathing give

magnesium and/or

terbutaline

# ory muc

# Profound distress

Impending Respiratory

Arrest (ESI I)

Fatigue

Poor to no air movement

Intubate (ketamine for RSI)

Dexamethasone 0.6 mg/kg (Max 16mg) IV

Albuterol per ETT by RT

Consult PICU MD and RRT

Tier 1 PICU ADMIT

# Continuous albuterol 10-20 mg/hr.

Dexamethasone 0.6 mg/kg up to 16 mg maximum; PO x 1 (may give IM/IV if unable to tolerate PO)

IV hydration

Consider adjunct medications (magnesium, terbutaline, epinephrine, ketamine)

**Consider Heliox** 

VBG

Chest x-ray

# **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.

<b>Data Considerations</b>	Interventions	Rationale
Steroids	Dexamethasone	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
		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
Inhaled Medications	Albuterol & Ipratropium	Treatment with combination albuterol ipratropium appears to reduce hospitalization compared to albuterol alone.
	(Duoneb)	Patients with severe respiratory distress have decreased rates of hospitalization and improvement in pulmonary function when
	Continuous Albuterol	treated with continuous Albuterol nebulizer
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) **Severity Score Parameter** 0 2 3 1 93-95% Room air SPO2 >95% 90-92% <90% Accessory Muscle Use Mild Moderate None Severe Inspiratory/Expiratory 2:1 1:1 1:2 1:3 Ratio None **End expiratory** Inspiratory and Inspiratory and Wheezing expiratory with expiratory with good aeration 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:

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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.

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