**ASTHMA PATHWAY GUIDELINES**

**Definition:**
Asthma is a chronic inflammatory disorder of the airways in which many cells and cellular elements play a role. The chronic inflammation is associated with airway hyperresponsiveness that leads to recurrent episodes of wheezing, breathlessness, chest tightness and coughing. Symptoms may worsen in the evening or in the morning. (GINA Global Strategy for Asthma Management and Prevention, 2012) Asthma is one of the most common chronic disorders in children and is one of the leading causes of school absenteeism.

**Etiology:**
Although the exact etiology of asthma is unknown, environmental factors and allergens are known factors influencing exacerbations.

**Differential Diagnosis:**
- GERD
- Other causes of chronic aspiration
- Recurrent VLR
- Sinusitis
- Foreign body aspiration

**Guideline Eligibility Criteria:**
Patients 2 to 18 years of age with acute asthma exacerbation

**Guideline Exclusion Criteria:**
- Bronchiolitis
- Cystic Fibrosis
- Tracheostomy
- Neuromuscular disease
- Immune deficiency
- Cardiac disease
- Other Chronic Lung Disease (unless otherwise specified)

**Diagnostic Evaluation:**
*History and physical pertinent to the exacerbation should be completed concurrently with prompt initiation of treatment.*
(GINA Global Strategy for Asthma Management and Prevention, 2012)

**History:**
Assess for severity and duration of symptoms, medication history, risk factors and common times or exacerbations to an onset of symptoms.

**Physical Examination:**
To include: assessment of dyspnea, respiratory rate, work of breathing, presence and location of wheezing, need for oxygen

**Laboratory Tests:**
None recommended for uncomplicated asthma exacerbation

**Critical Points of Evidence**

**Evidence Supports**
- Use of a common scoring tool and pathway to categorize severity and improve clinical outcomes
- Oxygen for saturation consistently below 90%
- Short acting beta-agonist as soon as treatment can be started
- Glucocorticosteroids within the first hour of arrival to hospital/ED
- Ipratropium bromide for moderate to severe asthma
- Intravenous magnesium sulfate for treatment of moderate to severe asthma

**Evidence Lacking/Inconclusive**
- Terbutaline and epinephrine should be given only if aerosolized treatments are not tolerated or patient has not been response to treatments listed above
- Non-Invasive positive pressure ventilation prior to intubation

**Practice Recommendations**
Treatments for asthma have been widely studied and recommendations adopted based on studied and recommended standards of care. Many of these standards of care have been adopted by the Joint Commission since 2007 and were set forth as Orynx measures for pediatric healthcare agencies.

**Common Asthma Scoring Tool: Modified Quereshi PAS**
Measuring response to therapy can be a very useful tool in the management of asthma. No universal pediatric asthma scoring tool has been identified as superior, but there are several in the literature that have been validated and implemented in clinical practice. Our institution has adopted a modified version of the Quereshi Pediatric Asthma Score.
Treatment Recommendations
(for full recommendations see attached pathway and addendums)

Beta-agonist dosing (albuterol)
Emergency Department (PAS score Q1 hour)
1st hour
- Mild (PAS 0): No treatment required
- Mild (PAS 1-2): Albuterol 5mg Neb
- Moderate (PAS 3-5): Albuterol Neb over 1 hour (<20 kg- 10mg Neb or >20kg- 15mg Neb)
- Moderate to Severe (PAS 6-10): Albuterol Continuous (<20 kg- 10mg Neb or >20kg- 15mg)

2nd hour
- Mild (PAS 0-2): Discharge home
- Moderate (PAS 3-5): Albuterol Neb over 1 hour (<20 kg- 10mg Neb or >20kg- 15mg Neb)
- Moderate to Severe (PAS 6-7): Albuterol over 1 hour (<20 kg- 10mg Neb or >20kg- 15mg)

3rd hour
- Mild (PAS 0-2): Discharge home
- Moderate (PAS 3-5): Albuterol Neb over 1 hour (<20 kg- 10mg Neb or >20kg- 15mg Neb)
- Moderate to Severe (PAS 6-7): Albuterol Continuous (<20 kg- 10mg Neb or >20kg- 15mg)

Inpatient (PAS score Q4hr unless otherwise noted)
- Mild: Albuterol Q4 hours (8 puffs w/inhaler)
- Moderate: Albuterol Q3 hours (<20 kg- 5 mg Neb or ≥20kg- 7.5 mg Neb)
- Moderate to Severe: Albuterol Continuous (<20 kg- 10 mg Neb or ≥20kg- 15 mg Neb, with Q2hr PAS scores at minimum)
- Severe: Albuterol Continuous (<20 kg- 15 mg Neb or ≥20kg- 20 mg Neb, with Q2hr PAS scores at minimum)

Steroids
There is strong evidence that corticosteroids speed the resolution of airflow obstruction and reduce rate of relapse, especially if given within the first hour of admission to ED.
- Recommended: Dexamethasone has shown to just as effective as prednisolone and has the added benefit of decreased vomiting and less doses, thus increasing compliance.
  - Dosing: Dexamethasone 0.6 mg/kg PO/IM/IV (max: 16 mg) every day x2 doses (Separate the 2 doses by 24-36 hours)
- For dexamethasone allergies or intolerance: Prednisolone
  - Dosing: Prednisolone 1 mg/kg (max: 40 mg/dose) PO Q12hr For 5 days

Severe exacerbations
Methylprednisolone
- Initial Dose: Methylprednisolone 2 mg/kg IV x1 (max: 60 mg)
  - (skip this step if methylprednisolone or dexamethasone already given)
- 6 hours later: methylprednisolone 1 mg/kg IV Q6hr (max: 60mg/dose)
  - Full recommendations and methylprednisolone weaning instructions are supplied in addendum 1

Ipratropium Bromide
Strongly recommended as an adjunctive therapy for patients with moderate to severe symptoms
- Dosing: Ipratropium 1 mg via neb- in conjunction with Albuterol

Magnesium Sulfate
Strong recommendation to be used as an adjunctive therapy when there is no response to conventional therapies.
- Dosing: Magnesium Sulfate 50 mg/kg IV (max 2 g) over 20-30 min. x1
  - Strongly consider NS bolus if not already given
  - Only one dose may be administered on units, other than pediatric intensive care, in a 24 hour period

Terbutaline
Terbutaline and epinephrine should be given only if aerosolized treatments are not tolerated or patient has not been response to treatments listed above
- Dosing: 10mcg/kg SQ (Max 250mcg=0.25ml) X1 for child in extremis (can be given Q 20minutes x3 doses until IV established)
  - If considering IV Terbutaline it must be ordered in concert with STAT PICU consult
    - Recommended starting dose: 10 mcg/kg (max 250 mcg) IV load over 15 minutes
    - followed by continuous IV drip 0.4 mcg/kg/min
  - STAT call to Pharmacy for IV drip Terbutaline

Pediatric Intensive Care ONLY
Pepcid PO or IV per Protocol
- Pepcid should be administered PO when the patient is tolerating feeds/diet, discontinue upon transfer to floor

Ketamine
- Dosing Ketamine 2mg/ml- 5 mcg/kg/minute continuous IV drip (titrate per protocol to meet sedation needs)
**Admission Criteria**
Supplemental oxygen requirement
No improvement to baseline after multiple respiratory treatments
Stage 1 (Score 1-2) = Acute Care Unit
*Note: Discharge is recommended for scores of 0-2, admission will only occur for score 0-2 if oxygen is required or there is concern for deterioration
Stage 2 (Score 3-5) = Acute Care Unit
Stage 4a (Score 6-7) = Pulmonary Unit
Stage 4b (Score 6-7) = Intermediate Care Unit (Meeting Pulmonary Unit Exclusion Criteria and/or IMC Inclusion Criteria)
Stage 5 (Score 8-10) = Pediatric Intensive Care Team/ Unit

**Consults and Referrals**
Pulmonology for patients with chronic symptoms and multiple admissions

**Infection Control**
Standard isolation only unless viral factors are suspected

**Caregiver Education**
Children should not be exposed to passive smoke, explore smoking cessation opportunities as indicated
Emphasize importance of follow-up appointments
Emphasize importance of following recommendations on the Home Management Plan of Care (HMPOC)

**Discharge Criteria**
Albuterol- 8 puffs or 5 mg Q4 times 1 dose
Oxygen Saturation >90 for more than 2 hours

**Follow-Up Care**
Generally follow-up care is 1-2 days post discharge with the primary care doctor

**Prevention**
Caregiver and patient knowledge of HMPOC
Knowledge of common triggers and how to prepare or avoid Proper use and understanding of inhaled corticosteroids and controller medications

**Outcome Measures**
Emergency Department (ED):
Time from ED triage to administration of beta agonist
Time form ED triage to administration of steroids
Proportion receiving 1st neb within 60 minutes of arrival
Proportion receiving steroid within 60 minutes of arrival
Proportion of patients assessed for understanding of HMPOC
Readmissions to ED within 30 days and within 12 months
Inpatient (IP):
Proportion of patients with a documented home management plan of care
Proportion of patients assessed for their understanding of HMPOC
Average length of stay
**Inclusion Criteria:**
Patients 2-18 years of age with acute asthma exacerbation

**Exclusion Criteria:**
- bronchiolitis, cystic fibrosis, tracheostomy patients, neuromuscular diseases, immunodeficiency & cardiac patients (unless ordered), and other chronic lung disease (unless ordered)

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### 1st HOUR

**PAS 1-2**
- Albuterol 5 mg Neb
- Repeat per clinician discretion
- Consider Steroids in some cases- consult with physician

**PAS 3-5**
- Albuterol Neb over 1 hour
  - <20 kg: Albuterol 10 mg
  - ≥20 kg: Albuterol 15 mg
- Ipratropium 1 mg via neb- in conjunction with Albuterol
- Dexamethasone 0.6 mg/kg (max 16 mg) PO/IM
- Methylprednisolone 2mg/kg (max 60mg) IV for PO intolerant

**PAS 3-5**
- Supplemental Oxygen should be administered to maintain SaO2 >90%
- Initial PAS score done at triage and on room placement

NOTE: CXR and Blood Gas are not recommended for Routine Asthma Exacerbation

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### 2nd HOUR

**PAS 0-2 Discharge to HOME**
- Asthma Action Plan
- Asthma Education to include Smoking Cessation referral if indicated
- Re-label Albuterol
- Re-label Controller Meds, if applicable
- Script for Dexamethasone Dose

**PAS 3-5**
- Albuterol Neb over 1 hour
  - <20 kg: Albuterol 10 mg/ ≥20 kg: Albuterol 15 mg
- Ipratropium 1 mg via neb- in conjunction with Albuterol
- Dexamethasone 0.6 mg/kg (max 16 mg) PO/IM
- Methylprednisolone 2mg/kg (max 60mg) IV for PO intolerant

**PAS 6-7**
- Admit to Pulmonary Unit or IMC
  - (see Addendum 5 for Pulmonary Unit exclusion criteria and IMC inclusion criteria)
  - <20 kg: Albuterol 10 mg over 1 hour/ ≥20 kg: Albuterol 15 mg

**PAS 8-10 POOR RESPONDER**
- Albuterol Neb over 1 hour (continuous) as necessary
  - <20 kg: Albuterol 10 mg/ ≥20 kg: Albuterol 15 mg

**PAS 3-5**
- Albuterol Neb over 1 hour
  - <20 kg: Albuterol 10 mg/ ≥20 kg: Albuterol 15 mg

**PAS 6-7**
- Supplemental Oxygen should be administered to maintain SaO2 >90%

**PAS 8-10**
- Albuterol Neb over 1 hour (continuous) as necessary
  - <20 kg: Albuterol 10 mg/ ≥20 kg: Albuterol 15 mg

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### 3rd HOUR

**PAS 0-2 Discharge to HOME**
- See above recommendations

**PAS 3-5 Admit to FLOOR**
- <20 kg: Albuterol 10 mg Neb Q2h
  - ≥20 kg: Albuterol 15 mg Neb Q2h

**PAS 6-7**
- Supplemental Oxygen should be administered to maintain SaO2 >90%

**PAS 8-10 POOR RESPONDER- Admit to PICU**
- <20 kg: Albuterol 15 mg Neb over 1 hour/Continuous
  - ≥20 kg: Albuterol 20 mg Neb over 1 hour/Continuous

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**Adjunctive Therapy Options**
- IV NS bolus (20ml/kg, max 1L)
- Magnesium Sulfate 50 mg/kg IV (max 2 x) over 20-30 min. x1
- Terbutaline 10mcg/kg SQ (Max 250mcg=0.25ml) X1 for child in extremis (can be given Q 20minutes x3 doses until IV established)
- If considering IV Terbutaline
  - Must be ordered in concert with STAT PICU consult
  - Recommended starting dose:
    - 10 mcg/kg (max 250 mcg) IV load over 15 minutes, followed by: Terbutaline continuous IV drip 0.4 mcg/kg/min
  - STAT call to Pharmacy for IV drip Terbutaline

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**Puff Conversions**
- 5 mg neb = 8 puffs
- 10 mg neb = 16 puffs
- Q3 hours= 5 puffs Q1 hour x3
- Continuous= 5 puffs Q20min. x3

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**IMC Inclusion Criteria**
- Patients 2-18 years of age with acute asthma exacerbation
- Must be ordered in concert with STAT PICU consult
- Follow-up by Re-labeling

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**Exclusion Criteria**
- bronchiolitis, cystic fibrosis, tracheostomy patients, neuromuscular diseases, immunodeficiency & cardiac patients (unless ordered), and other chronic lung disease (unless ordered)

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**Admit to Pulmonary Unit or IMC**
- (see Addendum 5 for Pulmonary Unit exclusion criteria and IMC inclusion criteria)
- <20 kg: Albuterol 10 mg over 1 hour/ ≥20 kg: Albuterol 15 mg

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  - <20 kg: Albuterol 10 mg over 1 hour/ ≥20 kg: Albuterol 15 mg

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**Respiratory Rate (Obtain over 30 seconds and multiply x2)**

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<td>35-39</td>
<td>&gt;40</td>
</tr>
<tr>
<td>4-5 years old</td>
<td>&lt;30</td>
<td>31-35</td>
<td>&gt;36</td>
</tr>
<tr>
<td>6-12 years old</td>
<td>&lt;26</td>
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</tr>
<tr>
<td>&gt;12 years old</td>
<td>&lt;23</td>
<td>24-27</td>
<td>&gt;28</td>
</tr>
</tbody>
</table>

**O2 Oxygen Requirement**
- (RA for 2min- Return O2 if Sats <90)
- >90% RA
- 90-95% RA
- <90% RA

**A Auscultation**
- BBS clear to End exp. wheeze
- Expiratory Wheezes
- Insp. & Exp. wheeze or Diminished BS

**WOB Work of Breathing**
- <1 accessory muscle
- 2 accessory muscles
- ≥3 accessory muscles

**D Dyspnea**
- Speaks full sentences, playful, babbles
- Speaks partial sentences, short cry
- Speaks short phrases, single words, grunting

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**IF TRANSFER BED UNAVAILABLE FOLLOW THE Inpatient Asthma Pathway Guidelines**

06-14-2015
Inpatient Asthma Pathway Guidelines

- Reassess PAS score with every treatment
- Supplemental O2 to maintain SaO2 >90%
- Smoking cessation counseling when indicated

**STAGE 1**
PAS Score 1-2
Acute Care
Mild

- Albuterol Q4 hours
  8 puffs w/inhaler

**STAGE 2**
PAS Score 3-5
Acute Care
Moderate

- Albuterol Q3 hours
  <20 kg- 5 mg Neb
  ≥20kg- 7.5 mg Neb

**STAGE 3**
WEANING Guidelines:
From PU, IMC or PICU to moderate score treatments

- Albuterol Q2 hours x2
  <20 kg- 10 mg Neb
  ≥20kg- 15 mg Neb

**STAGE 4a**
PAS Score 6-7
Pulmonary Unit
Moderate to Severe

- Albuterol Continuous
  (max: 6 doses)
  <20 kg- 10 mg Neb
  ≥20kg- 15 mg Neb
  (with Q2hr PAS scores at minimum)

**STAGE 4b**
PAS Score 6-7
IMC
Moderate to Severe

- Albuterol Continuous
  <20 kg- 15 mg Neb
  ≥20kg- 20 mg Neb
  (with Q2hr PAS scores at minimum)

**STAGE 5**
PAS Score 8-10
PICU
Severe

- Albuterol Continuous
  (max: 6 doses)
  <20 kg- 10 mg Neb
  ≥20kg- 15 mg Neb
  (with Q2hr PAS scores at minimum)

**Clinical Readiness for Discharge**
- Albuterol- 8 puffs or 5 mg Q4 times 1 dose
- Oxygen Saturation >90 for more than 2 hours

**Comorbidity**
Patients scoring a zero(0) will continue to receive an RT PAS score Q4 hours, if not clinically ready to discharge home

**Units for Admission and Transfer**
- Stage 1 (Score 1-2) = Acute Care Unit
- Stage 2 (Score 3-5) = Acute Care Unit
- Stage 4a (Score 6-7) = Pulmonary Unit
- Stage 4b (Score 6-7) = IMC
  (Meeting Pulmonary Unit Exclusion Criteria and/or IMC Inclusion Criteria)
- Stage 5 (Score 8-10) = PICU team

**Albuterol to MDI w/ Spacer**
Puff Conversions
- 5mg neb = 8 puffs
- 10mg neb= 16 puffs
- Continuous= 5 puffs Q20min. x3
- Q2 hours= 4 puffs Q30 minutes x4
- Q3 hour= 5 puffs Q1 hour x 3
- 15mg neb= 24 puffs
- Continuous= 8 puffs Q20min. x3
- Q2 hours= 6 puffs Q30 minutes x4
- Q3 hour= 8 puffs Q1 hour x3

**Pepcid PO or IV per protocol:**
- Pepcid should be administered PO when the patient is tolerating feeds/diet
- Discontinue upon transfer to the floor

**Patients should show score improvement within 6 hours of admission to Pulmonary Unit. If no improvement, transfer to IMC. Patient will remain under care of PCRS.**

**Magnesium Sulfate:**
- 50 mg/kg IV (max: 2 grams) may be given over 20-30 minutes x1 if not given in ED
- Max: 2 doses per 24 hour period

**Pepcid PO or IV per protocol:**
- Pepcid should be administered PO when the patient is tolerating feeds/diet
- Discontinue upon transfer to the floor

**See Pediatric Intensive Care Asthma Pathway Guidelines**

**Stages:**
- **STAGE 1**
  - PAS Score 1-2
  - Acute Care
  - Mild

- **STAGE 2**
  - PAS Score 3-5
  - Acute Care
  - Moderate

- **STAGE 3**
  - WEANING Guidelines:
    - From PU, IMC or PICU to moderate score treatments

- **STAGE 4a**
  - PAS Score 6-7
  - Pulmonary Unit
  - Moderate to Severe

- **STAGE 4b**
  - PAS Score 6-7
  - IMC
  - Moderate to Severe

- **STAGE 5**
  - PAS Score 8-10
  - PICU
  - Severe

**Items Required for Discharge Home**
- (see addendum 4)

**Units for Admission and Transfer**
- Stage 1 (Score 1-2) = Acute Care Unit
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- Pepcid should be administered PO when the patient is tolerating feeds/diet
- Discontinue upon transfer to the floor

**See Pediatric Intensive Care Asthma Pathway Guidelines**

**Any patient scoring >8 will be managed by the PICU team.**
Pediatric Intensive Care Asthma Pathway Guidelines

**Inclusion criteria:**
- Patients 2-18 years of age with acute asthma exacerbation
- Poor responders to treatment
- Patients in Extremis
- Patients Scoring 8 or higher on the PAS
- Patients not showing improvement within 6 hours of admission to the Pulmonary High Acuity Unit

**Standards of Care (care every patient will receive)**

- **Albuterol Continuous Nebulizer:**
  - PAS 8-10: <20kg = 15 mg/hr or ≥20kg = 20 mg/hr
  - PAS 6-7: <20kg = 10 mg/hr or ≥20kg = 15 mg/hr once patient is weaned from terbutaline & magnesium sulfate drip
  - Respiratory Therapy will score the patient, at a minimum, every two hours
  - Respiratory Therapy will contact the Physician/ Mid-level/ Resident for weaning orders
  - Please see the Inpatient Asthma Pathway Guidelines for dosing once patient is deemed ready to be off continuous nebs

- **Methylprednisolone:** 1 mg/kg IV Q6 hours x 24 hours (max: 60mg per dose)
  - (see Addendum 1 for methylprednisolone management and weaning guidelines)

- **Pepcid PO or IV per protocol**
  - (Pepcid should be administered PO when the patient is tolerating feeds/diet, discontinue upon transfer to floor)

- **Ipratropium:** <20kg - 0.25 mg or ≥20kg - 0.5 mg inhaled Q6 hours x 24 hours

- **Magnesium Sulfate:** 50 mg/kg IV (2 grams max) over 20-30 minutes (if not given in ED or Pulmonary High Acuity Unit)

**Medications for Refractory Treatment**

- **Ipratropium:** <20kg - 0.25 mg or ≥20kg - 0.5 mg inhaled Q6 hours, may continue per physician discretion if necessary

- **Terbutaline 1mg/ml:** Loading dose 10mcg/kg (max: 250mcg) over 15 minutes followed by continuous IV drip 0.4 mcg/kg/minute
  - *Terbutaline drip should be weaned completely before weaning continuous Albuterol*

- **Magnesium Sulfate 50mg/ml:** <30kg - 25 mg/kg/hr or ≥30kg - 20 mg/kg/hr continuous IV drip (max: 2g per hour)
  - Check serum magnesium 2 hours after the drip is started then Q8 hours (serum magnesium target = 3-5 mg/dL)
  - *Tritrate by 5mg/kg/hr based on serum levels*

- **Ketamine 2mg/ml:** 5 mcg/kg/minute continuous IV drip
  - *Tritrate per protocol to meet sedation needs*

**Recommendations for Discharge or Transfer out of the Pediatric Intensive Care Unit**

- **DISCHARGE HOME**
  - PAS 1-2 (ready for discharge home) - See addendum 4 for Discharge Readiness Criteria and Requirements

- **ADMIT TO FLOOR**
  - PAS 1-2 (NOT ready for discharge home)
  - PAS 3-5

- **ADMIT TO PULMONARY UNIT**
  - PAS 6-7 (for patients exhibiting steady improvement)

- **ADMIT TO IMC**
  - PAS 6-7 (not exhibiting steady improvement, but no longer requiring PICU care)
### Respiratory Service

**Respiratory Rate**

- **2-3 yrs:** 34 or Less Breaths per Minute
- **4-5 yrs:** 30 or Less Breaths per Minute
- **6-12 yrs:** 26 or Less Breaths per Minute
- **>12 yrs:** 23 or Less Breaths per Minute

- **2-3 yrs:** 35-39 Breaths per Minute
- **4-5 yrs:** 31-35 Breaths per Minute
- **6-12 yrs:** 27-30 Breaths per Minute
- **>12 yrs:** 24-27 Breaths per Minute

- **2-3 yrs:** 40 or Greater Breaths per Minute
- **4-5 yrs:** 36 or Greater Breaths per Minute
- **6-12 yrs:** 31 or Greater Breaths per Minute
- **>12 yrs:** 28 or Greater Breaths per Minute

**Room Air SpO2**

- Greater Than 95%
- 90-95%
- Less than 90%

**Auscultation**

- Clear Breath Sounds to End Expiratory Wheezes Only
- Inspiratory & Expiratory Wheezes or Diminished Breath Sounds

**Work of Breathing**

- Use of 0-1 Accessory Muscles Assessed
- Use of 2 Accessory Muscles Assessed
- Use of 3 or Greater Accessory Muscles Assessed

**Dyspnea**

- Speaks Full Sentences, Playful, Babbles
- Speaks Partial Sentences, Short Cry
- Speaks Short Phrases, Single Words, Grunting

**Total Asthma Severity Score (0-10)**

**Asthma Protocol Stage**

**Albuterol Dose Given (mg)**

**Next Assessment Time**

**Patient Label**

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**Dell Children's Medical Center of Central Texas**

**Pediatric Asthma Albuterol Titration Protocol Severity Score Sheet**

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<th>Date (month &amp; day)</th>
<th>Time</th>
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<th>Credentials (example: RN, RT)</th>
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<td>4-5 yrs: 30 or Less Breaths per Minute</td>
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<td>6-12 yrs: 26 or Less Breaths per Minute</td>
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<td>&gt;12 yrs: 23 or Less Breaths per Minute</td>
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<td>2-3 yrs: 35-39 Breaths per Minute</td>
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<tr>
<td>4-5 yrs: 31-35 Breaths per Minute</td>
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<tr>
<td>2-3 yrs: 40 or Greater Breaths per Minute</td>
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<tr>
<td>4-5 yrs: 36 or Greater Breaths per Minute</td>
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<tr>
<td>6-12 yrs: 31 or Greater Breaths per Minute</td>
<td>2</td>
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<td>&gt;12 yrs: 28 or Greater Breaths per Minute</td>
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<tr>
<td><strong>Room Air SpO2</strong></td>
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<tr>
<td>RA SpO2 Greater Than 95%</td>
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<tr>
<td>RA SpO2 90-95%</td>
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<tr>
<td>RA SpO2 Less than 90%</td>
<td>2</td>
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<tr>
<td><strong>Auscultation</strong></td>
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<tr>
<td>Clear Breath Sounds to End Expiratory Wheezes Only</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Inspiratory &amp; Expiratory Wheezes or Diminished Breath Sounds</td>
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<td>1</td>
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<td>1</td>
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<td><strong>Work of Breathing</strong></td>
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<tr>
<td>Use of 0-1 Accessory Muscles Assessed</td>
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<tr>
<td>Use of 2 Accessory Muscles Assessed</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Use of 3 or Greater Accessory Muscles Assessed</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
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<tr>
<td><strong>Dyspnea</strong></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Speaks Full Sentences, Playful, Babbles</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Speaks Partial Sentences, Short Cry</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Speaks Short Phrases, Single Words, Grunting</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
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<tr>
<td><strong>Total Asthma Severity Score (0-10)</strong></td>
<td></td>
<td></td>
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<tr>
<td><strong>Asthma Protocol Stage</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td><strong>Albuterol Dose Given (mg)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Next Assessment Time</strong></td>
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<td>Signature</td>
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</tbody>
</table>
ADDENDUM 1:
Ordering and Weaning Instructions for Steroid Management in Asthma

Mild to Moderate
PAS Score 3-7
In 2nd hour

YES

Dexamethasone 0.6 mg/kg
PO/IM/IV (max: 16 mg) Qday
X2 doses
(includes the dose in ED)
Separate the 2 doses by
24-36 hours.

Alternative for allergies and
Intolerance only

Prednisolone 1 mg/kg
(max: 40 mg/dose) PO Q12hr
For 5 days

Severe Exacerbation
PICU

NO

YES

Initial Dose: Methylprednisolone
2 mg/kg IV x1 (max: 60 mg)
(skip this step if Methylprednisolone
or Dexamethasone already given)

THEN 6 hour later

Methylprednisolone 1 mg/kg IV
Q6hr (max: 60 mg/dose)

When patient off Terbutaline
gtt AND continuous Albuterol

Methylprednisolone Q6hr
< 5 days wean to

Methylprednisolone Q6hr
≥ 5 days wean to

Methylprednisolone 1 mg/kg IV
(max: 60 mg/dose) OR
Prednisolone 1mg/kg PO
(max: 40 mg/dose)
Q8hr for 1 day
(May skip this step if the patient
is improving rapidly.)

Methylprednisolone 1 mg/kg IV
(max: 60 mg/dose) OR
Prednisolone 1mg/kg PO
(max: 40 mg/dose) Q8hr for 2 days

Wean to

Prednisolone 1 mg/kg PO
Q12hr for 3-5 days
(max: 40 mg/dose)

Wean to

Prednisolone 0.5 mg/kg PO
(max: 20 mg/dose)
Q12hr for 3-5 days

Patients started on methylprednisolone (Solumedrol)
should complete their steroid course with prednisolone
(Orapred).

Exception:
If patient has received only one
dose of methylprednisolone then
they can receive the 2 doses of
decadron as is outlined in the ED
and Inpatient Pathways.
Addendum 2:
Ordering Instructions for Inhaled Corticosteroids for Asthma

Start controller for ALL asthmatics classified with mild, moderate or severe persistent asthma

**Inpatient**

Start Flovent or Advair at a dose based on age and/or severity of the patient’s asthma (addendum 3)

**Discharge**

FLOVENT-
Common Canister
(multi-patient use)

ADVAIR-
Common Canister
(multi-patient use)

Medicaid?
(Amerigroup, CHIP, Superior)

**YES**

Flovent

Enter discharge prescription for for an equivalent dose of Qvar (addendum 3)

**NO**

Advair

Enter discharge prescription for Advair or an equivalent dose of Symbicort or Dulera (addendum 3)

Enter discharge prescription for the same Flovent dose given while inpatient

How to Find Insurance Information in COMPASS

1. Open patient’s electronic chart
2. Go to patient information band on left hand side
3. Choose face sheet tab
4. Scroll down for insurance information
Addendum 3:
Inhaled Corticosteroids for Asthma

<table>
<thead>
<tr>
<th>Generic Name</th>
<th>Brand Name</th>
<th>Low Daily Dose (mcg)</th>
<th>Medium Daily Dose (mcg)</th>
<th>High Daily Dose (mcg)</th>
<th>Medicaid preferred?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beclomethasone HFA 40 or 80 mcg/puff</td>
<td>Qvar</td>
<td>NA 80-160 80-240</td>
<td>NA 160-320 241-480</td>
<td>NA 320+ 480+</td>
<td>Yes</td>
</tr>
<tr>
<td>Budesonide DPI 90,180,200 mcg/inh</td>
<td>Pulmicort Flexhaler</td>
<td>NA 180-400 180-600</td>
<td>NA 400-800 601-1200</td>
<td>NA 800+ 1200+</td>
<td>Yes</td>
</tr>
<tr>
<td>Budesonide neb 0.25mg/2ml, 0.5mg/2ml</td>
<td>Pulmicort</td>
<td>0.25-0.5mg 0.5mg</td>
<td>NA 0.5-1mg 1mg</td>
<td>NA 1mg+ 2mg</td>
<td>No, call if needed</td>
</tr>
<tr>
<td>Ciclesonide HFA 80, 160mcg/puff</td>
<td>Alvesco</td>
<td>NA 40 160</td>
<td>NA 80 160-320</td>
<td>NA 160 320-640</td>
<td>No</td>
</tr>
<tr>
<td>Flunisolide HFA 250mcg/puff</td>
<td>Aerobid-M</td>
<td>NA 500-750 500-1000</td>
<td>NA 1000-1250 1000-2000</td>
<td>NA 1251+ 2000+</td>
<td>No</td>
</tr>
<tr>
<td>Fluticasone HFA 44,110,220mcg/puff</td>
<td>Flovent</td>
<td>176 (mask) 88-176 88-264</td>
<td>177-352 (mask) 177-352 265-440</td>
<td>352+ (mask) 352+ 440+</td>
<td>No</td>
</tr>
<tr>
<td>Fluticasone DPI 50,100,250mcg/inh</td>
<td>Flovent</td>
<td>NA 100-200 100-300</td>
<td>NA 200-400 300-500</td>
<td>NA 400+ 500+</td>
<td>No</td>
</tr>
<tr>
<td>Fluticasone/Salmeterol HFA: 45/21,115/21,230/21</td>
<td>Advair</td>
<td>176 (mask) 88-176 88-264</td>
<td>177-352 (mask) 177-352 265-440</td>
<td>352+ (mask) 352+ 440+</td>
<td>Yes</td>
</tr>
<tr>
<td>Fluticasone/Salmeterol Disk: 100/50,250/50,500/50</td>
<td>Advair</td>
<td>NA 100-200 100-300</td>
<td>NA 200-400 300-500</td>
<td>NA 400+ 500+</td>
<td>Yes</td>
</tr>
<tr>
<td>Mometasone DPI 110,220mcg/inh</td>
<td>Asmanex</td>
<td>NA NA 200</td>
<td>NA NA 400</td>
<td>NA NA 400+</td>
<td>Yes</td>
</tr>
<tr>
<td>Mometasone/Formoterol HFA: 100/5, 200/5</td>
<td>Dulera</td>
<td>NA NA 200</td>
<td>NA NA 400</td>
<td>NA NA 800+</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*Medicaid plans reflected above are Amerigroup, Sendero, and CHIP. Drugs covered for these plans may change at any time and without notice.

NA = Dosing not available in this age group
Updated 11/15/13
Addendum 4
Pediatric Asthma Pathway

Clinical Readiness for Discharge

☐ Albuterol- 8 puffs or 5 mg Q4 times 1 dose

☐ Oxygen Saturation >90 for more than 2 hours

Items Required for Discharge Home

☐ Asthma Action Plan

☐ Asthma Education

☐ Influenza Vaccine per hospital protocol if not already received for the year
   (not applicable in ED- refer to primary provider)

☐ Order Albuterol MDI and re-label for home use with applicable home instructions

☐ Prescription for Controller (addendum 2)

☐ Steroids: Dexamethasone script for dose #2- 0.6 mg/kg PO x1 (max: 16mg rounded to nearest 1 or 4mg tab) if second dose was not received in the hospital

   Family education/ prescription instructions:
   Give 24-36 hours after initial dose.
   Crush and mix in a small bite of food or a teaspoon of liquid that the child prefers.

   If the patient received methylprednisolone (Solumedrol) or prednisolone (Orapred), see addendum 1 for steroid management and write an applicable prescription to finish the course of treatment.

☐ Smoking Cessation, if indicated
Addendum 5:

Pulmonary Unit Exclusion Criteria

The exclusion criterion to be applied to potential Pulmonary Unit (asthma high-acuity) admissions does not supersede clinician decision making. Should the clinician feel that the child’s placement would be better-suited in a higher level of care despite the presence of exclusion criteria; the clinician’s decision should be honored.

- Level of Consciousness
  - The child’s cognition should not be impaired. Documentation should show that the child is alert and oriented. Caution should be taken when deciding whether the child’s mental status is below baseline due to the assessment being made during normal sleep hours. If there is any question of altered mental status being present, the child is no longer appropriate for high-acuity unit placement.

- Blood Pressure
  - Common blood pressure side-effects from bronchodilators are increased systolic and decreased diastolic pressures. The demands on the cardiac muscle during an asthma exacerbation are increased with a subsequent drop in myocardial perfusion creating a hazardous situation. Should the child’s diastolic blood pressure fall below PALS standards without improvement after ONE NS bolus, the child is excluded.
    - Should the child report chest pain in the context of low diastolic blood pressure, then the child is excluded regardless of NS bolus administration.

- Pulmonary Insufficiency
  - Oxygen use alone is not a reason to exclude from admission. After beta-agonist Rx has been applied and 15-20 minutes have passed to allow for equilibration of V/Q mismatch, if the child has new onset need for oxygen via simple face mask then the child is not appropriate for high-acuity unit placement.

IMC Inclusion Criteria

- If the patient scores 6-7 and meets one or more of the above criteria, the patient should be admitted to the IMC remaining under the care of PCRS.
- If the patient is still a score of 6-7 after 6 hours in the Pulmonary Unit, the patient should be transferred to the IMC under the care of PCRS.
- If no beds are available in the acute care or Pulmonary Unit, the patient should be admitted to the IMC under the care of PCRS.

Any patient in the acute care, Pulmonary Unit or IMC scoring of an 8 or more should be under the care of the PICU team.
**Beta-Agonist**


**Heliox**


**Ipratropium**


**Magnesium Sulfate**


Magnesium Sulfate, continued


Noninvasive Positive Pressure Ventilation


Oxygen


Scoring Tool: Modified Quereshi PAS

Steroids

- Edmonds, M.; Camargo, C. A.; Pollack, C. V.; and Rowe, B. H. (2009). Early use of inhaled corticosteroids in the emergency department treatment of acute asthma. Cochrane Database of Systematic Reviews, (4) Abstract not available

Terbutaline