TEXAS CHILDREN'S HOSPITAL
EVIDENCE-BASED OUTCOMES CENTER
Asthma/Recurrent Wheezing Clinical Guideline
Evidence-Based Guideline

Definition: [1] Acute asthma exacerbations or "asthma attacks" are episodes of progressive increase in shortness of breath, cough, wheezing, or chest tightness, or some combination of these symptoms. Respiratory distress is common. Exacerbations are characterized by decreases in expiratory airflow that can be quantified by measurement of lung function (PEF or FEV_1).

Pathophysiology: [2] Asthma is a complex process that depends on the interaction of:

- Bronchoconstriction
- Airway hyperresponsiveness
- Airway inflammation, resulting in edema and mucus plugging

Inclusion Criteria

- Patients ≥2 years with a diagnosis of asthma/recurrent wheezing in whom foreign body or vocal cord dysfunction have been ruled out

Exclusion Criteria

- Other chronic lung disease, bronchiolitis, bacterial pneumonia, neurological disorders, immunodeficiency diseases, and cardiac patients

Differential Diagnosis: [1-2]

Foreign body — Croup
Heart failure — Vocal cord dysfunction
GERD

Diagnostic Evaluation

History of the Exacerbation: Assess for [1-3]

- Severity and duration of symptoms, including exercise limitation and sleep disturbance
- All current medications, including dose (and device) prescribed, dose usually taken, frequency, dose taken in response to the deterioration, and the patient's response (or lack thereof) to this therapy
- Time of onset and cause of the present exacerbation
- Risk factors for asthma-related death
- Level of control

History of Disease: Assess for [2]

- Patient/Family history of asthma, eczema, and/or smoking
- Patient history of allergic rhinitis, sinusitis, nasal polyps, eczema, or BPD
- Recurrent cough, bronchitis, or bronchiolitis
- Cough, wheeze, shortness of breath, and/or chest tightening that occurs in an "episodic" fashion. These symptoms may occur or worsen with:
  - Exercise
  - Weather change
  - Nighttime hours
  - Viral infection
  - Inhalant exposure (e.g., smoke, fur, dust mites, mold, pollen)
  - Irritant exposure (e.g., airborne chemicals, smoke)
  - Strong emotions (e.g., laughing, crying)
  - Menstrual cycle

Physical Examination [2]

- Evaluate patient's ability to complete a sentence
- Pulse rate
- Respiratory rate
- Use of accessory muscles
- Severity of respiratory symptoms using the Clinical Respiratory Score (CRS)
- Rhinitis, increased nasal secretions, mucosal swelling, or nasal polyps

Exacerbation Severity Assessment Tool

Clinical Respiratory Score (CRS)			
Assess	**Score 0**	**Score 1**	**Score 2**
Respiratory Rate	< 2 mos: < 50 2-12 mos: < 40 1-5 yrs: < 30 > 5 yrs: < 20	< 2 mos: 50-60 2-12 mos: 40-50 > 1-5 yrs: 30-40 > 5 yrs: 20-30	< 2 mos: > 60 2-12 mos: > 50 > 1-5 yrs: > 40 > 5 yrs: > 30
Auscultation	Good air movement, scattered expiratory wheezing, loose rales/crackles	Depressed air movement, inspiratory and expiratory wheezes or rales/crackles	Diminished or absent breath sounds, severe wheezing, or rales/crackles, or marked prolonged expiration
Use of Accessory Muscles	Mild to no use of accessory muscles, mild to no retractions, no nasal flaring on inspiration	Moderate intercostal retractions, mild to moderate use of accessory muscles, nasal flaring	Severe intercostal and substernal retractions, nasal flaring
Mental Status	Normal to mildly irritable	Irritable, agitated, restless.	Lethargic
Room Air SpO_2	> 95%	90-95%	< 90%
Color	Normal	Pale to normal	Cyanotic, dusky

(Add score from all rows to calculate total CRS score)

Risk factors for asthma-related death include:

- Comorbid conditions such as heart or lung disease
- Previous severe exacerbation (e.g., intubation or ICU admission)
- ≥2 hospitalizations or >3 EC visits within the past year
- Use of >2 canisters of short-acting beta-agonist (SABA) per month
- Difficulty perceiving airway obstruction or the severity of worsening asthma (parent and/or child)
- Low socioeconomic status or inner-city residence
- Illicit drug use
- Major psychosocial problems or psychiatric disease

Life-threatening asthma *involves a constellation of symptoms, including:*

- Marked chest tightness
- Wheezing, severe shortness of breath
- Retractions
- Cyanosis
- Inability to speak or speak in sentences due to dyspnea
- Hunched posture
- Altered mental status (agitation, anxiety, lethargy)

Critical Points of Evidence*

Evidence Supports

- The Clinical Respiratory Score (CRS) should be used to determine the level of exacerbation severity. [4-7, unpublished TCH data] – Strong recommendation, moderate quality evidence
- Pulse oximetry should be used as part of the CRS to determine the level of exacerbation severity. [1,8,9] – Strong recommendation, low quality evidence
- Dexamethasone should be given orally in the Emergency Department (ED) and in the inpatient setting and should be administered immediately during a moderate to severe exacerbation. [1,3,10-16] – Weak recommendation, low quality evidence
- Prednisolone/Prednisone should be given orally in the ambulatory setting. [1,3,10-16] – Weak recommendation, low quality evidence
- Immediately administer SABA via metered-dose inhaler (MDI) for children with mild to severe asthma, reserving continuous SABA only for children requiring administration more than every 1 hour and for children with life-threatening asthma. [2,3,17-20] – Strong recommendation, moderate quality evidence
- Either albuterol or levalbuterol should be used for SABA administration via MDI. [1,3,21-26] – Strong recommendation, moderate quality evidence
- Albuterol should be used for SABA administration via nebulizer. Nebulized levalbuterol is an equally effective alternative but is much more expensive than nebulized albuterol. [21-26] – Strong recommendation, moderate quality evidence
- Ipratropium bromide should be used with beta-agonist for three doses as adjunct therapy in children with moderate to severe asthma exacerbations. [1-3,27-30] – Strong recommendation, high quality evidence
- IV magnesium sulfate should be used as adjunct therapy when there is inadequate response to conventional therapy within the first hour in children with moderate to severe asthma exacerbations. [31-34] – Strong recommendation, moderate quality evidence
- IV terbutaline should be used in a monitored care setting for the treatment of children with severe asthma exacerbations. [35] – Weak recommendation, low quality evidence
- Non-invasive positive pressure ventilation should be used prior to intubation in children with severe asthma exacerbations. [36-40] – Strong recommendation, low quality evidence
- Tailored educational interventions should be delivered to all patients seen at TCH. [41-50] – Strong recommendation, high quality evidence
- All patients seen at TCH should be given a written asthma action plan. [3,49,51,52] – Strong recommendation, high quality evidence
- Discharge patients from the IP setting once the child has successfully completed every three-hour SABA X 2. [3,53,54] – Strong recommendation, low quality evidence
- Any asthma patient admitted to the hospital should be referred to the After Hospital Asthma Clinic or a specialist if not already done. [1,55,56] – Strong recommendation, low quality evidence

Evidence Against

- Spirometry should not be used routinely to determine the level of exacerbation severity, except in select cases (obesity and vocal cord dysfunction). Spirometry may have a role in the management of the patient later in the hospital course. [57,58] – Strong recommendation, low quality evidence
- Peak expiratory flow measurements should not be used to determine the level of exacerbation severity, except in patients with established use. [59,60] – Strong recommendation, low quality evidence
- Chest radiographs should not be used to determine the level of exacerbation severity. [1-3,61-63] – Strong recommendation, moderate quality evidence
- End tidal carbon dioxide ($ETCO_2$) measurements should not be used to determine the level of exacerbation severity. [64,65] – Strong recommendation, low quality evidence
- Heliox should not be used in the treatment of children with asthma exacerbations. [3,66,67] – Strong recommendation, low quality evidence
- Subcutaneous terbutaline or epinephrine should not be used in the treatment of children with asthma exacerbations. [68-74] – Strong recommendation, low quality evidence
- Serum potassium levels should not be checked routinely in patients with no other underlying conditions that would worsen the effect of hypokalemia. [75-81] – Strong recommendation, moderate quality evidence

Evidence Lacking/Inconclusive

- Blood gases should be used in the critical care setting to determine the level of exacerbation severity. [1-3,76,80,82] – Weak recommendation, low quality evidence
- Administer oxygen to maintain SpO_2 ≥90%; however, transiently lower levels may be acceptable in patients who are otherwise ready for discharge. – Consensus recommendation
- Discontinue long-acting beta-agonists when short-acting beta-agonists are required more often than four-hourly. [3] – Consensus recommendation
- Any patient with high ED usage (≥4 visits/year) should be referred to the After Hospital Asthma Clinic or a specialist if not already done. – Consensus recommendation
- There is insufficient evidence to address the following topics: oxygen weaning strategy, SABA weaning strategy [3,53,54], continuation or no continuation of LABA for patients admitted to observation or inpatient status, impact of cohorting asthma inpatients or having an asthma unit [70], doubling the dose of inhaled corticosteroid at the first signs of an exacerbation (prehospital) [83,84].

*NOTE: The references cited represent the entire body of evidence reviewed to make each recommendation.

Condition-Specific Elements of Clinical Management

General: The child's age and severity of illness are important factors to consider in diagnosing and managing an acute asthma exacerbation.

Treatment Recommendations:
Exacerbation Management (see Respiratory Assessment and Management Protocol [RAMP], p. 5):

Emergency Center
1. Obtain brief history, perform physical exam, and assess exacerbation severity using the CRS (p. 1). (4-7)
2. Administer oxygen to maintain SpO_2 ≥90%. Transiently lower levels may be acceptable in patients who are otherwise ready for discharge.
3. Initiate SABA (levalbuterol or albuterol via MDI or albuterol via nebulizer, depending on severity) (1-3, 17-26)
4. Consider/Administer dexamethasone. (1,3,10-16)
5. If severity warrants, consider/add ipratropium bromide (up to 3 doses). (1-3,27-30)
6. If there is inadequate response within the first hour of conventional therapy, consider/administer IV magnesium sulfate. (31-34)
7. If condition unchanged or worsening, consider initiation of adjunct therapies, including IV terbutaline and non-invasive positive pressure ventilation (NPPV), and admit to PICU. (35-40)
8. If condition unchanged or slightly improving but continued close monitoring is required, consider IP admission.
9. If condition has improved greatly, wean SABA, complete Asthma Action Plan (see Table 1 on p. 4 for additional guidance), and discharge home. (3,49,51,52)

PICU
1. Continue above and consider adjunct therapies yet to be initiated.
2. Consider intubation and mechanical ventilation as needed.
3. Continue to reassess. When improving, refer to RAMP and follow to discharge.

Inpatient Care
1. Begin discharge process upon admission.
2. Continue therapies and wean as appropriate according to RAMP.
3. Administer flu shot, if not already given. (85)
4. Complete Asthma Action Plan (see Table 1 on p. 4 for additional guidance) and discharge home once discharge criteria are met. (3,49,51,52)

Admission Criteria
- Oxygen saturation consistently <90%
- CRS ≥4
- Unsafe to send home/poor follow-up

Discharge Criteria
- No oxygen requirement
- CRS ≤3
- Response sustained at least 1-3 h after last SABA (EC) OR SABA q3h X 2 (Inpatient)
- Asthma Action Plan given
- Asthma Education complete
- Appropriate support system (e.g., PCP, caregivers)

Referrals/Follow-Up Care
- Any asthma patient admitted to the hospital should be referred to the After Hospital Asthma Clinic or a specialist if not already done (55-56)
- Any patient with high ED usage (≥4 visits/year) should be referred to the After Hospital Asthma Clinic or a specialist if not already done
- Criteria for referral to the Life-Threatening Asthma (LTA) Clinic:
  - PICU admission
  - On ventilator at any time
  - Very high ED usage without admission (≥5 visits/year)
  - Admission to the floor/PCU >2 times in past 18 months
  - History of asthma complication (e.g., loss of consciousness, seizure, cardiopulmonary arrest)
- Smoking cessation information should be given to patients, parents, and/or caregivers who are smokers.

Balanced Scorecard Measures
Process
- Time from ED arrival to delivery of beta-agonist
- Proportion of patients with a chest x-ray obtained
- Proportion of patients who received an Asthma Action Plan
- Proportion of patients filling controller medications

Outcome
- Readmission rate to the ED and inpatient

Table 1. Classifying Asthma Severity and Initiating Therapy [(2)]

	Intermittent	Mild Persistent	Moderate Persistent	Severe Persistent
Symptoms	≤2 days/week	>2 days/week	Daily	Throughout the day
Nighttime awakenings	0 (≤4 years) ≤2x/month (≥5 years)	1-2x/month (≤4 years) 3-4x/month (≥5 years)	3-4x/month (≤4 years) >1x/week (≥5 years)	> 1x/week (≤4 years) Often 7x/week (≥5 years)
SABA use	≤2 days/week	>2 days/week	Daily	Several times/day
Activity limitation	None	Minor	Some	Extreme
Oral steroid usage	0-1x/year	≥2x in 6 months or ≥4x/year (≤4 years) ≥2x/year (≥5 years)		
Recommended therapy	SABA PRN	Low-dose ICS	Medium-dose ICS or Low-dose ICS + LTRA or Low-dose ICS + LABA* *only if already prescribed by PCP or pulmonologist	Previous medications plus Subspecialist referral

RESPIRATORY ASSESSMENT AND MANAGEMENT PROTOCOL (RAMP) for Asthma Patients

Patients ≥ 2 years of age with asthma/wheezing excluding other chronic lung disease, bronchiolitis, bacterial pneumonia, neurological disorders, immunodeficiency diseases, and cardiac patients

Begin

Alert: Consider fast-tracking Life-Threatening Asthma Clinic patients
Brief history & physical exam w/ CRS
Administer oxygen to maintain SpO_2 ≥ 90% in asthma/wheezing patients. Transiently lower levels may be acceptable in patients who are otherwise ready for discharge.

CRS ≥ 8 — Yes →

CRS ≥ 8: Unable to talk, severe distress, impending or actual respiratory arrest
- Albuterol via nebulizer
- Add ipratropium bromide immediately (up to 3 doses)
- Administer IV dexamethasone
- Administer IV magnesium sulfate
- Consider other adjunct therapies
  - IV terbutaline
  - Non-invasive positive pressure ventilation
- Admit to PICU
- For impending respiratory arrest, prepare for intubation and consult Critical Care
- Continue to reassess; when improving, refer to RAMP and follow to discharge

No

1st Hour

CRS ≤ 3*
- Albuterol/Levalbuterol via MDI w/ valved holding chamber (VHC) X 1 dose (6 puffs)
- Consider dexamethasone (oral route preferred)

CRS 4-7
- Administer dexamethasone
- Albuterol via nebulizer X 3 doses (every 20 min PRN, up to 3 doses)
- Add ipratropium bromide (up to 3 doses)
- Consider IV magnesium sulfate

CRS ≥ 8
- Refer to gray box above

Repeat CRS assessment

2nd Hour

Good Response
CRS ≤ 3*
- Wean SABA via MDI w/ VHC (4 puffs)

Incomplete Response
CRS 4-7
- Consider continuous albuterol
- Consider ipratropium bromide (up to 3 doses), if not already done
- Administer IV magnesium sulfate, if not already done

Poor Response
CRS ≥ 8
- Refer to gray box above

3rd Hour

Good Response
CRS ≤ 3*
- Discharge home from the EC
- Assess severity using a standardized tool and initiate/continue/escalate long-term controller medications
- Order albuterol with spacer
- Order dexamethasone for home
- Review medications including drug delivery technique
- Refer to the After Hospital Asthma Clinic, a specialist, or the Life-Threatening Asthma Clinic (see p. 5 of the guideline for specific criteria)

EC Discharge Criteria:
Response sustained at least 1-3 h after last SABA
Room air
CRS ≤ 3
Asthma Action Plan given
Asthma education complete
Appropriate support system (e.g., PCP, caregivers)

Repeat CRS assessment

Incomplete Response
CRS 4-7
- Begin/Continue continuous albuterol
- Admit under IP status

Poor Response
CRS ≥ 8
- Refer to gray box above

Admission

Repeat CRS assessment

- Administer oxygen to maintain SpO_2 ≥ 90% in asthma/ wheezing patients. Transiently lower levels may be acceptable in patients who are otherwise ready for discharge.
- **RT to contact the nurse at the 1st q3h. The nurse will contact the attending for the discharge order.**
- **Order asthma education**
- **Complete Asthma Action Plan and prepare for discharge**

Inpatient

Good Response
CRS ≤ 3*
- Wean SABA and oxygen
- Continue dexamethasone q24h X 1 dose
- Restart/Initiate controller medications as clinically indicated

Incomplete Response
CRS 4-7
- Wean SABA and oxygen
- Continue dexamethasone q24h X 1 dose
- Restart/Initiate controller medications as clinically indicated

Poor Response
CRS ≥ 8
- Refer to gray box above

Repeat CRS assessment

Inpatient SABA Weaning Regimen
All SABA to be administered via MDI unless otherwise ordered by a clinician
Criteria for weaning: CRS 3-6 and improving, VS stable, and weaning from O_2

Previous Treatment Level:	Wean To:
SABA or MDI 8 puffs →	6 puffs and continue to taper
Continuous SABA →	q2h
q1h →	q2h
q2h →	q3h X 2, then q4h PRN

- Discharge home from Inpatient Unit
- Assess severity using a standardized tool and initiate/continue/escalate long-term controller medications
- Review medications including drug delivery technique
- Refer to the After Hospital Asthma Clinic, a specialist, or the Life-Threatening Asthma Clinic (see p. 5 of the guideline for specific criteria)

Inpatient Discharge Criteria:
Room air
CRS ≤ 3
SABA q3h X 2
Asthma Action Plan given
Asthma Education complete
Appropriate support system (e.g., PCP, caregivers)

Medication Table

Medication	Route	Dose
Corticosteroids		
dexaMETHasone	PO	0.6 mg/kg/dose q24h (MAX: 16 mg) X 2 doses OR Emergency Center standardized dosing: Pt weight: > 5-7.5 kg, give 4.5 mg Pt weight: > 7.5-10 kg, give 6 mg Pt weight: > 10-15 kg, give 9 mg Pt weight: > 15-20 kg, give 12 mg Pt weight: > 20 kg, give 16 mg
dexaMETHasone	IV	0.6 mg/kg/dose q24h (MAX: 16 mg) X 2 doses
Adjunct Therapies		
magnesium sulfate	IV	40 mg/kg/dose (MAX: 2 grams) once
terbutaline	IV	0.5 mcg/kg/min continuous infusion, increase by 0.5 mcg/kg/min; may require 3-6 mcg/kg/min

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Appendix A. Asthma Action Plan

MY HOSPITAL ASTHMA ACTION PLAN - 6/24/2014 for Test Review

- MY ASTHMA LEVEL OF SEVERITY IS: Mild Persistent
- MY ASTHMA TRIGGERS ARE: smoke, air pollution, colds/respiratory infections, mold. Avoid these when possible.
- REMEMBER: WASH MY HANDS and get a YEARLY FLU SHOT to help avoid infections.
- REMEMBER: Use spacer with metered dose inhalers. Rinse mouth after using inhaled controller.

Green Zone Plan	**GREEN ZONE MEDICATIONS**
 **In the Green Zone I have:** • No cough • No wheeze • No chest tightness	**My CONTROLLER MEDICINE(S) I should take EVERY DAY to help me stay well:** {CONTROLLER MEDS:24665}
Yellow Zone Plan	**YELLOW ZONE MEDICATIONS**
 **In the Yellow Zone I have:** • Early asthma symptoms • A slight cough or wheeze • The start of a cold	**Take QUICK RELIEF Medicine:** {YELLOW ZONE MEDS:23512::"Albuterol (Proventil, Ventolin, ProAir) or Xopenex inhaler 4 inhalations every 4 hours as needed with spacer"} Continue taking my **GREEN ZONE** controller medicine(s) **CALL MY DOCTOR** if I don't get to the **GREEN ZONE** after **24 hours.**
Red Zone Plan	**RED ZONE MEDICATIONS**
 **In the Red Zone I have:** • An increasing cough • Continued or increasing wheeze • Fast breathing	**TAKE NOW QUICK RELIEF medicine in YELLOW ZONE or increase to:** {RED ZONE MEDS:26557::"Albuterol (Proventil, Ventolin, ProAir) or Xopenex inhaler 6 inhalations every 2-3 hours as needed with spacer for 9-12 hours"} {RED ZONE STEROIDS:26558} Continue taking my **GREEN ZONE** controller medicine(s) **CALL MY DOCTOR NOW**. Go to the **HOSPITAL** if I cannot reach my doctor.
DANGER ZONE 	**I NEED IMMEDIATE HELP** **CALL 911 or go to nearest Emergency Room if:**	*- Breathing very hard or fast* *- Breathing so hard I can't walk or talk* *- Using neck or stomach muscles to breath* *- Chest is sucking in between ribs* *- QUICK RELIEF medications are NOT WORKING* *- Lips or fingertips look blue* *- Nose opens wide with breathing.* ***CONTINUE QUICK RELIEF medicine in RED ZONE***

My Doctor is: { :19399} **Phone Number:** { :19400} **I should follow-up:** {Time; follow-up:23707::"within 1 week"}. **Completed by:** MD INTEGRATED DUAL TCH, MD on 6/24/2014 at 12:47 PM.

Appendix B. Recommendations for children <2 years [3]

The assessment of acute asthma exacerbations in children <2 years can be difficult. The differential diagnosis of symptoms includes aspiration pneumonitis, pneumonia, bronchiolitis, tracheomalacia, and complications of underlying conditions such as congenital anomalies and cystic fibrosis. These children may not respond to the treatment recommendations made in this guideline.

Clinical Standards Preparation

This clinical standard was prepared by the Evidence-Based Outcomes Center (EBOC) team in collaboration with content experts at Texas Children's Hospital. Development of this clinical standard supports the TCH Quality and Patient Safety Program initiative to promote clinical standards and outcomes that build a culture of quality and safety within the organization.

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Development Process

This clinical standard was developed using the process outlined in the EBOC Manual. The literature appraisal documents the following steps:

1. Review Preparation
   - PICO questions established
   - Evidence search confirmed with content experts
2. Review of Existing External Guidelines
   - British Guideline on the Management of Asthma, GINA Global Strategy for Asthma Management and Prevention, NAEPP Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma, and guidelines from other children's hospitals
3. Literature Review of Relevant Evidence
   - Searched: PubMed, Cochrane, CINAHL, Google Scholar, ProQuest, SumSearch
4. Critically Analyze the Evidence
   - 10 systematic reviews, 30 randomized controlled trials, and 50 nonrandomized studies
5. Summarize the Evidence
   - Materials used in the development of the clinical standard, literature appraisal, and any order sets are maintained in an Acute Asthma Exacerbations evidence-based review manual within EBOC.

Evaluating the Quality of the Evidence

Published clinical guidelines were evaluated for this review using the **AGREE II** criteria. The summary of these guidelines are included in the literature appraisal. AGREE II criteria evaluate Guideline Scope and Purpose, Stakeholder Involvement, Rigor of Development, Clarity and Presentation, Applicability, and Editorial Independence using a 4-point Likert scale. The higher the score, the more comprehensive the guideline.

This clinical standard specifically summarizes the evidence *in support of* or *against* specific interventions and identifies where evidence is *lacking/inconclusive*. The following categories describe how research findings provide support for treatment interventions.
"Evidence Supports" provides evidence to support an intervention
"Evidence Against" provides evidence against an intervention.
"Evidence Lacking/Inconclusive" indicates there is insufficient evidence to support or refute an intervention and no conclusion can be drawn *from the evidence.*

The **GRADE** criteria were utilized to evaluate the body of evidence used to make practice recommendations. The table below defines how the quality of the evidence is rated and how a strong versus weak recommendation is established. The literature appraisal reflects the critical points of evidence.

Recommendation	
STRONG	Desirable effects clearly outweigh undesirable effects or vice versa
WEAK	Desirable effects closely balanced with undesirable effects
Quality	**Type of Evidence**
High	Consistent evidence from well-performed RCTs or exceptionally strong evidence from unbiased observational studies
Moderate	Evidence from RCTs with important limitations (e.g., inconsistent results, methodological flaws, indirect evidence, or imprecise results) or unusually strong evidence from unbiased observational studies
Low	Evidence for at least 1 critical outcome from observational studies, RCTs with serious flaws or indirect evidence
Very Low	Evidence for at least 1 critical outcome from unsystematic clinical observations or very indirect evidence

Recommendations

Practice recommendations were directed by the existing evidence and consensus amongst the content experts. Patient and family preferences were included when possible. The Content Expert Team and EBOC team remain aware of the controversies in the management of acute asthma exacerbations in children. When evidence is lacking, options in care are provided in the clinical standard and the accompanying order sets (if applicable).

Approval Process

Clinical standards are reviewed and approved by hospital committees as deemed appropriate for its intended use. Clinical standards are reviewed as necessary within EBOC at Texas Children's Hospital. Content Expert Teams are involved with every review and update.

Disclaimer

Practice recommendations are based upon the evidence available at the time the clinical standard was developed. Clinical standards (guidelines, summaries, or pathways) do not set out the standard of care and are not intended to be used to dictate a course of care. Each physician/practitioner must use his or her independent judgment in the management of any specific patient and is responsible, in consultation with the patient and/or the patient's family, to make the ultimate judgment regarding care.

Version History

Action	Date
Originally completed	November 2009
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