

INCLUSION CRITERIA

Children ≥ 2 years old with a history of asthma or wheezing necessitating albuterol use who present with symptoms of asthma exacerbation or wheezing

EXCLUSION CRITERIA

- Anaphylaxis
- Pneumonia
- Cardiac disease requiring chronic medications
- Cystic fibrosis
- Immunodeficiency
- Suppurative lung disease
- Tracheostomy
- Sickle cell disease
- Medically complex
- Impending respiratory failure

MEASURES

- Respiratory score utilization
- Time from arrival to steroid administration
- Time from arrival to albuterol administration
- LOS

ALBUTEROL ADMINISTRATION

- MDI with spacer preferred for intermittent dosing

DIFFERENTIAL DIAGNOSES

- Foreign body aspiration
- Pneumonia
- Croup
- Heart failure
- Anaphylaxis

NOT ROUTINELY RECOMMENDED

- CXR unless significant hypoxia, focal abnormality, prolonged course of illness, or persistent severe distress
- Antibiotics

DISCHARGE CRITERIA

- Pulse ox $\geq 90\%$
- Tolerating oral intake

ADMISSION CONSIDERATIONS

Consider Acute Care: hypoxemia (oxygen sat. $< 90\%$), requiring additional frequent albuterol doses or continuous albuterol, inability to tolerate PO

Consider PICU: severe score with failure to improve, FiO_2 requirements $> 50\%$, hemodynamic instability, altered mental status

INITIAL ASSESSMENT

- Utilize Asthma Exacerbation Clinical Pathway Order Set
- Perform physical examination to assess exacerbation severity, complicating factors, and differential diagnoses of acute breathlessness
- Place on continuous cardiorespiratory monitoring
- Provide oxygen/respiratory support PRN to achieve oxygen saturation of $\geq 90\%$
- Obtain history including current reliever and maintenance medications

Determine Respiratory Score

Respiratory Score 2-4 Initial Treatment

- Give albuterol¹ MDI every 15 minutes up to 3 doses
- Give dexamethasone PO

Respiratory Score 5-8 Initial Treatment

- Give albuterol¹ MDI every 15 minutes for 3 doses
- Give dexamethasone PO

Respiratory Score ≥ 9 Initial Treatment

- Consider IV placement
- Give ipratropium with albuterol nebulized every 15 min. for 3 doses **OR** ipratropium with albuterol continuous over 1 hr.
- Give dexamethasone PO/IV
- Consider magnesium sulfate IV and IVF bolus concurrently administered with albuterol
- Consider IVF bolus

Reassess and Rescore

Mild Respiratory Score 1-4

- If first score was moderate or severe, monitor up to 1 hr. prior to discharge and treat accordingly

Moderate Respiratory Score 5-8

- Give continuous albuterol nebulized for 1 hr.
- Give ipratropium nebulized for 3 doses (if not previously received)

Severe Respiratory Score ≥ 9

- Give continuous albuterol nebulized for 1 hr.
- Give ipratropium nebulized for 3 doses (if not previously received)
- Consider magnesium sulfate IV and IVF bolus if not previously administered
- Consider IVF bolus

Clinical decline?

Yes

No

Discharge Medications

- Prescribe a second dose of dexamethasone to take in 48 hours
- Albuterol¹ Q4 hrs. while awake until primary care follow up in 48 hrs.
- Prescribe any medications recommended by asthma plan if not currently available at home

Discharge Patient

- Discharge when criteria are met
- Provide related educational resources
- PCP follow up within 2 days

First score severe (≥ 9)?

Yes

No

Reassess and rescore

2nd Score 5-8 Obs.: ≤ 1 hr.

Yes

Respiratory score ≤ 4

No

Admit to Hospital

Respiratory Score				
Variable	0 Points	1 Point	2 Points	3 Points
Respiratory Rate				
2-3 yo		≤ 34	35-39	> 40
4-5 yo		≤ 30	31-35	> 36
6-12 yo		≤ 26	27-30	> 31
> 12 yo		≤ 23	24-27	> 28
Retractions				
	None	Mild retractions: subcostal or intercostal	Moderate retractions in 2 of the following: subcostal, intercostal, substernal OR nasal flaring	Severe retractions in 3 of the following: subcostal, intercostal, substernal, supraclavicular, OR nasal flaring/ head bobbing
Dyspnea * Automatic score of 1 for enteric feeding device or NPO				
2-4 yo (or >4 yo and nonverbal at baseline)	Normal feeding, vocalizations and play	1 of the following: decreased appetite, increased coughing after play, hyperactivity	2 of the following: decreased appetite, increased coughing after play, hyperactivity	Stops eating or drinking, stops playing, OR drowsy and confused
> 4 yo	Counts to ≥ 10 in one breath	Counts to 7-9 in one breath	Counts to 4-6 in one breath	Counts to ≤ 3 in one breath
Auscultation				
	No wheezing and/or clear breath sounds	End-expiratory wheeze only	Expiratory wheeze only (greater than end- expiratory wheeze)	Inspiratory/ expiratory wheeze OR diminished breath sounds OR both

ED/Urgent Care Albuterol Acute Treatment			
Weight	Dose		
	Albuterol MDI	Albuterol Nebulized	Albuterol Continuous
< 10 kg	4 inhalations	2.5 mg	5 mg/hr.
10-20 kg	6 inhalations	5 mg	10 mg/hr.
> 20 kg	8 inhalations		15 mg/hr.

Albuterol Discharge (Low Dose)		
Weight	Dose	
	Albuterol MDI	Albuterol Nebulized
< 10 kg	2 inhalations	2.5 mg
10-20 kg	4 inhalations	
> 20 kg		

Ipratropium	
Weight	Dose
< 10 kg	250 mcg
10-20 kg	500 mcg
> 20 kg	

Clinical Pathway Abbreviations

Abbreviation	Definition
ACT	Asthma Control Test
CBC with diff	Complete Blood Count with Differential
CXR	Chest-Xray
FEV1	Forced Expiratory Volume in 1 second
GERD	Gastroesophageal Reflux Disease
ICS	Inhaled Corticosteroid
IgE	Immunoglobulin E
LABA	Long-Acting Beta-Agonist
LAMA	Long-Acting Muscarinic Antagonist
LTRA	Leukotriene Receptor Antagonist
OCS	Oral Corticosteroid
PRN	As Needed
RAST	Radioallergosorbent Test
SABA	Short-Acting Beta-Agonist
SMART	Single Maintenance And Reliever Therapy

Disclaimer: The clinical pathways are based upon publicly available medical evidence and/or a consensus of medical practitioners at Nemours Children's Health ("Nemours") and are current at the time of publication. These clinical pathways are intended to be a guide for practitioners and may need to be adapted for each specific patient based on the practitioner's professional judgment, consideration of any unique circumstances, the needs of each patient and their family, and/or the availability of various resources at the health care institution where the patient is located.

VERSION MANAGEMENT

- Version 1.0 (3/31/2025): Go Live.

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