

MEDIC-Endorsed Guidelines for the Care of Children with Uncomplicated Asthma to Promote Safe Discharge from the ED

Supplemental Material

What is MEDIC?

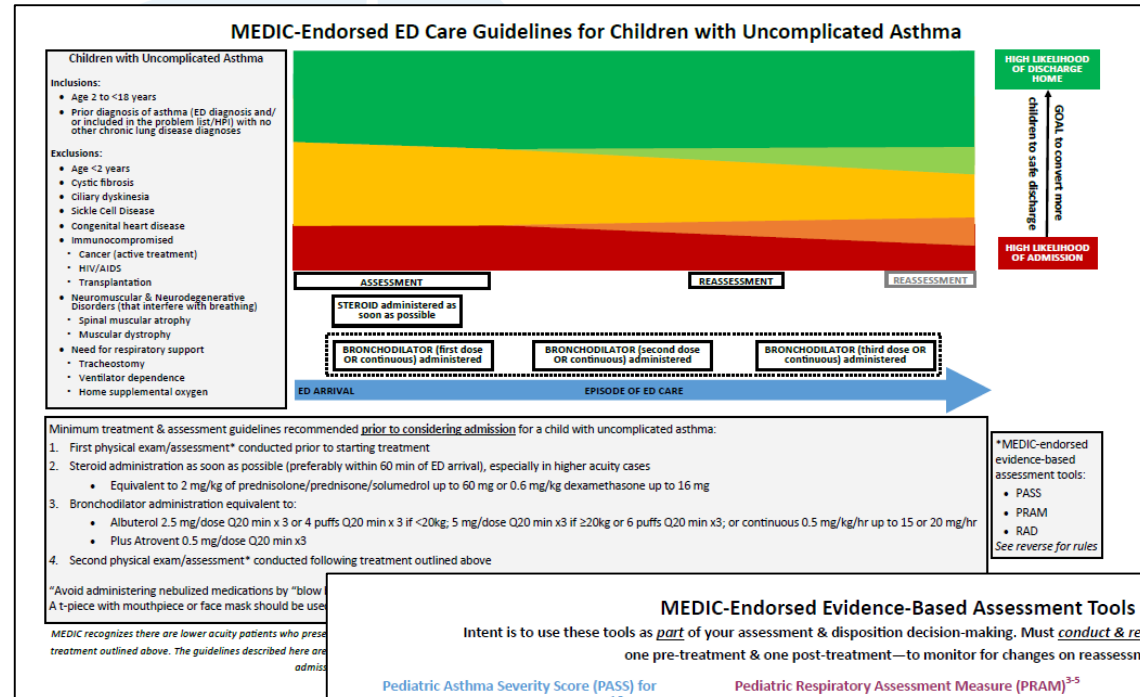
- The [Michigan Emergency Department Improvement Collaborative \(MEDIC\)](#) was launched in 2015 as an emergency physician-led quality improvement Collaborative comprised of hospitals across Michigan.
- MEDIC partners with emergency physicians who work together to collect and analyze data, identify best practices based on medical evidence, and improve collective performance.
- Participating EDs submit data to a clinical registry maintained by the MEDIC Coordinating Center.
- Support for MEDIC is provided by Blue Cross Blue Shield of Michigan and Blue Care Network within the [BCBSM Value Partnerships](#) program.

Why Standardize the ED Care for Children with Uncomplicated Asthma?

- Evidence-based guidelines for children with asthma exist & should be applied where appropriate
 - *Standardizing care results in less variability of outcomes*
- Optimizing initial ED treatment allows for increased opportunity for discharge for children with uncomplicated asthma
 - *Results in lower costs, appropriate testing, avoiding unnecessary stress on child and family/guardians*
 - *Potential to reduce unwarranted inpatient admissions*

About these guidelines

- Developed for the ED context
- To improve ED care for children with uncomplicated asthma via:
 - Consistent, standardized assessments including pre- & post-treatment
 - Minimum ED treatment of 1 steroid + 3 bronchodilators prior to admission decision
- With the goal of safe discharge home for appropriate cases
- Endorsed by MEDIC after evidence review & consensus-based vetting process



MEDIC-Endorsed Evidence-Based Assessment Tools

Intent is to use these tools as part of your assessment & disposition decision-making. Must conduct & record at least 2 assessments—one pre-treatment & one post-treatment—to monitor for changes on reassessment.

Pediatric Asthma Severity Score (PASS) for Asthma Exacerbation Severity^{1,2}
Pediatric patients 2-18 years old

Physical Exam Findings	Severity	Points
Wheezing	None or mild	0
	Moderate	+1
High-pitched expiratory sound heard by auscultation	Severe wheezing or absent due to poor air movement	+2
Work of breathing	None or mild	0
	Moderate	+1
Observed use of accessory muscles, retractions, or in-breathing	Severe	+2
	Normal or mildly prolonged	0
Prolongation of expiration Ratio of duration of expiration to inspiration	Moderately prolonged	+1
	Severely prolonged	+2
Points @ 1st Assessment		
Points @ Reassessment		
Max Points Possible		6

Pediatric Respiratory Assessment Measure (PRAM)^{3,5}
Pediatric patients 2-17 years old

Physical Exam Findings	Severity	Points
O ₂ saturation	≥95%	0
	92-94%	+1
	<92%	+2
Suprasternal retractions present	No	0
	Yes	+2
Scalene muscle contractions present	No	0
	Yes	+2
Air entry	Decreased at the base	+1
	Decreased at the apex and the base	+2
	Minimal or absent	+3
Wheezing	Absent	0
	Expiratory only	+1
	Inspiratory (+/- expiratory)	+2
Audible without stethoscope or silent chest (minimal or no air entry)		+3
	Points @ 1st Assessment	
Points @ Reassessment		
Max Points Possible		12

Respiratory Rate, Accessory Muscle Use, & Decreased Breath Sounds (RAD)⁶
Pediatric patients 5-17 years old

Physical Exam Findings	Severity	Points
Respiratory rate	≤24	0
	>24	+1
Respiratory rate at rest, on room air		
Accessory muscle use	Present	0
	Not present	+1
Decreased breath sounds	Normal	0
	Any decrease	+1
Any decreased breath sounds on auscultation		
Points @ 1st Assessment		
Points @ Reassessment		
Max Points Possible		3

Why the uncomplicated asthma population?

GOALS

Identify the cases that can reasonably be managed in the ED & safely discharged home

RATIONALE

Recognizing children come to the ED with varying degrees of asthma flare severity, by identifying this uncomplicated population we are appropriately scoping the guidelines that follow

LITERATURE

National Asthma Education and Prevention Program. Expert panel report 3 (EPR 3): Guidelines for the diagnosis and management of asthma-summary report 2007. *J Allergy Clin Immunol.* 2007;120:S94-S138.

Children with Uncomplicated Asthma

Inclusions:

- Age 2 to <18 years
- Prior diagnosis of asthma (ED diagnosis and/or included in the problem list/HPI) with no other chronic lung disease diagnoses

Exclusions:

- Age <2 years
- Cystic fibrosis
- Ciliary dyskinesia
- Sickle Cell Disease
- Congenital heart disease
- Immunocompromised
 - Cancer (active treatment)
 - HIV/AIDS
 - Transplantation
- Neuromuscular & Neurodegenerative Disorders (that interfere with breathing)
 - Spinal muscular atrophy
 - Muscular dystrophy
- Need for respiratory support
 - Tracheostomy
 - Ventilator dependence
 - Home supplemental oxygen

Why *steroid as soon as possible*?

Minimum treatment & assessment guidelines recommended prior to considering admission for a child with uncomplicated asthma:

1. First physical exam/assessment* conducted prior to starting treatment
2. Steroid administration as soon as possible (preferably within 60 min of ED arrival), especially in higher acuity cases
 - Equivalent to 2 mg/kg of prednisolone/prednisone/solumedrol up to 60 mg or 0.6 mg/kg dexamethasone up to 16 mg

GOALS

Standardize early steroid administration

RATIONALE

Steroids are a mainstay of acute asthma care with evidence of improved outcomes when administered early in the course of acute ED treatment that may impact disposition to home

LITERATURE

Bhogal SK, et al. Early administration of systemic corticosteroids reduces hospital admission rates for children with moderate and severe asthma exacerbation. *Ann Emerg Med*. 2012 Jul;60(1):84-91.e3.

Zemek R, et al. Triage nurse initiative of corticosteroids in pediatric asthma is associated with improved emergency department efficiency. *Pediatrics*. 2012 Apr;129(4):671-80.

Why at least 1 steroid + 3 bronchodilators administered prior to considering admission?

Minimum treatment & assessment guidelines recommended prior to considering admission for a child with uncomplicated asthma:

1. First physical exam/assessment* conducted prior to starting treatment
2. Steroid administration as soon as possible (preferably within 60 min of ED arrival), especially in higher acuity cases
 - Equivalent to 2 mg/kg of prednisolone/prednisone/solumedrol up to 60 mg or 0.6 mg/kg dexamethasone up to 16 mg
3. Bronchodilator administration equivalent to:
 - Albuterol 2.5 mg/dose Q20 min x 3 or 4 puffs Q20 min x 3 if <20kg; 5 mg/dose Q20 min x3 if ≥20kg or 6 puffs Q20 min x3; or continuous 0.5 mg/kg/hr up to 15 or 20 mg/hr
 - Plus Atrovent 0.5 mg/dose Q20 min x3

GOALS

Basic standard of care endorsed by NHLBI, all falls within the parameters of standard ED care/capabilities

RATIONALE

Children with acute asthma flares can take time to respond to treatment; this regimen is recommended by the NHLBI before making an admission decision & allows time for response to treatment

LITERATURE

National Asthma Education and Prevention Program. Expert panel report 3 (EPR 3): Guidelines for the diagnosis and management of asthma-summary report 2007. *J Allergy Clin Immunol.* 2007;120:S94-S138.

Why *PASS*, *PRAM*, & *RAD*?

GOALS

Provide a standardized framework for assessment/reassessment of a child's response to treatment

To emphasize the need for a standardized approach for assessment & reassessment of children receiving asthma treatment, we identified the *PASS*, *PRAM*, & *RAD* in the published literature

RATIONALE

Sites may use "home grown" tools if they meet the goals of standardized assessment of a child's response to treatment

Scores provide a standardized, quantifiable approach to assessment with which to measure change in status post-treatment – this is just one component of disposition decision-making

Alnaji F, et al. *PRAM* score as predictor of pediatric asthma hospitalization. *Acad Emerg Med*. 2014 Aug;21(8):872-8.

Arnold DH, et al. The *RAD* score: a simple acute asthma severity score compares favorably to more complex scores. *Ann Allergy Asthma Immunol*. 2011 Jul;107(1):22-8. Epub 2011 Apr 22.

Ducharme FM, et al. The Pediatric Respiratory Assessment Measure: A Valid Clinical Score for Assessing Acute Asthma Severity from Toddlers to Teenagers. *J of Pediatrics* 2008.

Gorelick MH, et al. Performance of a novel clinical score, the Pediatric Asthma Severity Score (*PASS*), in the evaluation of acute asthma. *Acad Emerg Med*. 2004 Jan;11(1):10-8.

Gorelick M, et al. Predicting need for hospitalization in acute pediatric asthma. *Pediatr Emerg Care*. 2008 Nov;24(11):735-44.

Gouin S, et al. Prospective evaluation of two clinical scores for acute asthma in children 18 months to 7 years of age. *Acad Emerg Med*. 2010 Jun;17(6):598-603.

*MEDIC-endorsed evidence-based assessment tools:

- *PASS*
- *PRAM*
- *RAD*

See reverse for rules

LITERATURE

Why focus on pre- & post-treatment assessments?

Intent is to use these tools as *part* of your assessment & disposition decision-making. Must conduct & record at least 2 assessments—one pre-treatment & one post-treatment—to monitor for changes on reassessment.

GOALS

Promote a standardized approach with an objective scoring system for assessment and reassessment of children with asthma as documented by ED providers (e.g. nurses, advanced providers, respiratory therapists & physicians)

RATIONALE

Standardization of care allows objective measure of improvement, failure to improve or worsening

EVIDENCE

MEDIC data abstraction reveals variation in provider documentation and/or performance of repeated (pre and post treatment) assessment in pediatric asthma patients, making it challenging to understand treatment decisions impact on trajectory of clinical response or disposition

Why no disposition decision recommendation based on a specific score?

RATIONALE

These scores have not been studied in the context of discharge

Alnaji F, et al. PRAM score as predictor of pediatric asthma hospitalization. *Acad Emerg Med*. 2014 Aug;21(8):872-8.

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LITERATURE

Why use a mask to administer nebulized medications?

“Avoid administering nebulized medications by “blow by,” or placing the mask or nebulizer tubing near the child’s nose and mouth rather than securing the mask properly to the face. A t-piece with mouthpiece or face mask should be used instead.”-American Academy of Pediatrics Section on Pediatric Pulmonary & Sleep Medicine, Choosing Wisely, August 17, 2020

GOALS

To support use of evidence-based effective asthma treatment delivery options in the ED

RATIONALE

Recognizing EDs' limitations (financial, pharmaceutical, operations, & personnel), evidence strongly supports use of topical inhaled asthma medications delivered by mask or inhaled with spacers over blow by nebulized medications as cost effective with comparable clinical effect

Abaya R, et al. Improving efficiency of pediatric emergency asthma treatment by using metered dose inhaler. *J Asthma*. 2019 Oct;56(10):1079-1086.

LITERATURE

Five Things Physicians and Patients Should Question. American Academy of Pediatrics Section on Pediatric Pulmonary & Sleep Medicine, Choosing Wisely. 2020 Aug.

<https://www.choosingwisely.org/societies/american-academy-of-pediatrics-section-on-pediatric-pulmonology-and-sleep-medicine/>.

Why are recommendations for steroid & bronchodilator dose/timing not specified?



GOALS

To support use of evidence-based effective asthma treatment

RATIONALE

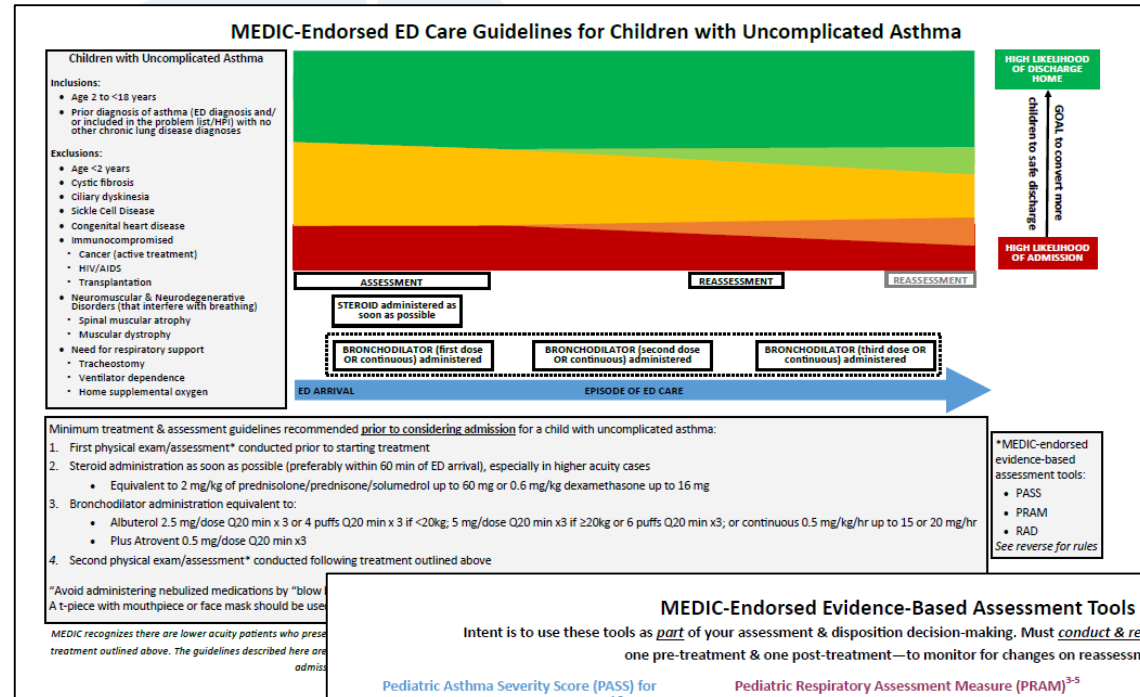
Recognize that there are a number of ways to operationalize the delivery of medications that meet these guidelines

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²Predicting need for hospitalization in acute pediatric asthma. Gorelick M, Scribano PV, Stevens MW, Schultz T, Schultz J. Pediatr Emerg Care. 2008 Nov;24(11):735-44.
³The Pediatric Respiratory Assessment Measure: A Valid Clinical Score for Assessing Acute Asthma Severity from Toddlers to Teenagers. Ducharme et al. J of Pediatrics 2008.
⁴PRAM score as predictor of pediatric asthma hospitalization. Alnaji F, Zemek R, Barrowman N, Plint A. Acad Emerg Med. 2014 Aug;21(8):872-8. doi: 10.1111/ajem.12422.
⁵Prospective evaluation of two clinical scores for acute asthma in children 18 months to 7 years of age. Gouin S, Robidas L, Gravel J, Guilmont C, Chalut D, Amre D. Acad Emerg Med. 2010 Jun;17(6):590-603.
⁶The RAD score: a simple acute asthma severity score compares favorably to more complex scores. Arnold DH, Gebretsadik T, Abramo TA, Moons KG, Sheller JR, Hartner TV. Ann Allergy Asthma Immunol. 2011 Jul;107(1):22-8. Epub 2011 Apr 22.

Key References

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- Five Things Physicians and Patients Should Question. American Academy of Pediatrics Section on Pediatric Pulmonary & Sleep Medicine, *Choosing Wisely*. 2020 Aug. <https://www.choosingwisely.org/societies/american-academy-of-pediatrics-section-on-pediatric-pulmonology-and-sleep-medicine/>.
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Key References cont'd

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- National Asthma Education and Prevention Program. Expert panel report 3 (EPR 3): Guidelines for the diagnosis and management of asthma-summary report 2007. *J Allergy Clin Immunol*. 2007;120:S94-S138. **This document can also be found here:** <https://www.nhlbi.nih.gov/health-topics/guidelines-for-diagnosis-management-of-asthma>.
- Zahran HS, et al. Vital Signs: Asthma in Children - United States, 2001-2016. *MMWR Morb Mortal Wkly Rep*. 2018 Feb 9;67(5):149-155.
- Zemek R, et al. Triage nurse initiative of corticosteroids in pediatric asthma is associated with improved emergency department efficiency. *Pediatrics*. 2012 Apr;129(4):671-80.