



Croup

Clinical Pathway Synopsis

Objective of Clinical Pathway

To provide care standards for the otherwise healthy patient diagnosed with croup in the Emergency Departments (ED), Urgent Care Centers (UCC), outpatient settings, and inpatient medical units. Standardization of care may reduce overutilization of chest radiographs, viral testing, and other laboratory testing. It may also decrease unnecessary hospitalization and inpatient length of stay.

Background

Croup, also known as viral laryngotracheitis, is a respiratory infection that affects infants and children aged three months to six years.¹ The clinical presentation often associated with croup is a barking cough, inspiratory stridor, and hoarseness of voice.² While many children diagnosed with croup can be managed on an outpatient basis, those children whose symptoms are accompanied by moderate to severe respiratory distress that does not adequately improve with outpatient management often require hospital admission.²

Management of croup focuses on supportive care. Children with stridor at rest, signs of respiratory distress, or hypoxemia have moderate to severe disease and require immediate evaluation by a medical provider.³ Corticosteroids and racemic epinephrine have been shown to relieve symptoms of croup and can help prevent unnecessary hospitalizations.^{1,3-4} Identifying the severity of a child's croup symptoms and understanding evidence-based management options can guide healthcare providers toward optimal care.

Target Users

- Physicians (Emergency Medicine, Urgent Care, Hospital Medicine, Primary Care, as well as fellows and residents in those settings)
- Advanced Practice Nurses
- Physician Assistants
- Staff Nurses
- Respiratory Therapists

Target Population

Inclusion Criteria

- Previously healthy patients (ages 6 months to 6 years) with the clinical presentation consistent with the diagnosis of croup.

Exclusion Criteria

- Toxic appearance
- Complex medical co-morbidities
- Hypotonia or neuromuscular disease
- Symptoms suggestive of an alternative diagnosis: expiratory wheeze, drooling or difficulty swallowing, prolonged or recurrent stridor, or poor response to treatment
- Known airway abnormalities: vocal cord paralysis, subglottic stenosis, tracheomalacia, laryngomalacia, history of vascular ring or tracheoesophageal fistula

Practice Recommendations

In lieu of a clinical practice guideline fully addressing the management of croup in pediatric patients, guidance from pediatric literature was used in conjunction with the expert consensus of the Croup Clinical Pathway Committee to inform the assessment, acute management, and referral guidance in this pathway.¹⁻²⁶

Additional Questions Posed by the Clinical Pathway Committee

1. [Is a lower dose of dexamethasone \(0.15mg/kg\) as effective as the standard dose \(0.6 mg/kg\) in improving clinical outcomes in children with croup \(inpatient or outpatient\)?](#)

These clinical pathways do not establish a standard of care to be followed in every case. It is recognized that each case is different, and those individuals involved in providing health care are expected to use their judgment in determining what is in the best interests of the patient based on the circumstances existing at the time. It is impossible to anticipate all possible situations that may exist and to prepare a clinical pathway for each. Accordingly, these clinical pathways should guide care with the understanding that departures from them may be required at times.



Recommendations from the Croup Clinical Pathway Committee

A **conditional** recommendation is made **against** the use of lower-dose dexamethasone based on very low certainty of evidence and clinical expertise. While evidence suggests that 0.15 mg/kg dosing may be sufficient in the outpatient setting, where patients have, on average, milder disease, there is insufficient evidence to support a lower dose for admitted patients.^{5,10,16} While three of the four studies excluded admitted patients, a single inpatient study found no difference in croup severity scores between lower and higher doses of dexamethasone at 2 hours.²³ However, the study favored 0.6 mg/kg dexamethasone at 6 and 12 hours, as evidenced by changes in croup severity scores.²³ Clinicians in ambulatory or emergency settings are unlikely to know at the time of dexamethasone ordering if the patient will require admission, and repeat dosing for admitted patients is not ideal.

2. [In patients aged 6 months to 6 years with croup \(laryngotracheitis\) seen in an acute care setting, which patient characteristics are associated with treatment after hospital admission?](#)

Recommendations from the Croup Clinical Pathway Committee

A **conditional** recommendation is made to assess patients' clinical status (respiratory rate, stridor, and need for repeat RE) following treatment of croup to determine appropriate management disposition, based on very low certainty of the evidence and clinical expertise. Patients with persistent or worsening respiratory signs, such as tachypnea or stridor, after epinephrine treatments in the acute care setting may be more likely to require interventions such as additional medications or respiratory support if they are admitted. Evidence shows that receiving 1-2 racemic epinephrine (RE) treatments in the acute care setting does not predict the need for inpatient interventions.^{7,12,14,18} In an acute care setting, dexamethasone and RE represent standard initial care for children with croup.^{1,7,19} Post-treatment assessment of the patient's respiratory status, including persistent tachypnea, ongoing stridor, and the need for repeat RE, helps healthcare providers determine appropriate transfer to higher levels of care, such as hospitalization, while reducing unnecessary escalation.^{7,9,11-12,14,22}

3. [Does observation time after a single dose of racemic epinephrine \(RE\) administration of 2 hours versus 3 or more hours result in similar treatment failure in children with croup?](#)

Recommendations from the Croup Clinical Pathway Committee

A **conditional** recommendation is made **for** a 2-hour observation period following the administration of a racemic epinephrine dose (0.5 ml of 2.5% solution via nebulizer) in the emergency department or urgent care clinic, based on the literature and clinical expertise.

Because RE has a short half-life, guidelines recommend observing patients for 1 to 3 hours after each dose to monitor for rebound stridor.^{7-8,20} Prolonged length of stay, driven by required observation periods, strains urgent care clinics' (UCC) and emergency departments' (ED) workflow, and places an added burden on families.²² Many acute care settings routinely transfer children who receive more than one RE treatment to a higher level of care, despite most receiving no additional interventions after transfer or admission.^{1,7,11-12,18} Recent studies indicate that children who receive one to two doses of RE with observation may be safely discharged from the outpatient setting.^{14,18,24-26}

This evidence led the Croup Clinical Pathway Committee to affirm the 2-hour observation period following RE administration. Additionally, the committee provides clinicians with guidance on using clinical reasoning and shared decision-making to tailor the observation time to address the patient's individual needs.

Updates from Previous Versions of the Clinical Pathway

- Information and evidence from recent literature on the efficacy of using a lower dose of dexamethasone (0.15 mg/kg versus 0.60 mg/kg). No changes will be made from current practices at Children's Mercy, and healthcare providers will continue to utilize 0.60 mg/kg.

These clinical pathways do not establish a standard of care to be followed in every case. It is recognized that each case is different, and those individuals involved in providing health care are expected to use their judgment in determining what is in the best interests of the patient based on the circumstances existing at the time. It is impossible to anticipate all possible situations that may exist and to prepare a clinical pathway for each. Accordingly, these clinical pathways should guide care with the understanding that departures from them may be required at times.



Measures

- Access of the clinical pathway (website hits)
- Utilization of associated order sets

Value Implications

The following improvements may increase value by reducing healthcare and non-monetary costs (e.g., missed school/work, lost wages, stress) for patients and families, and by reducing costs and resource utilization for healthcare facilities.

- Decreased frequency of admission, when appropriate (and fewer critical care transports)
- Decreased inpatient length of stay
- Decreased unwarranted variation in care

Organizational Barriers and Facilitators

Potential Barriers

- Variability of acceptable level of risk among providers
- Variability in experience among clinicians
- Risk of diagnostic error when an alternative diagnosis mimics croup
- Challenges with access to healthcare and health literacy faced by some families

Potential Facilitators

- Collaborative engagement across the continuum of clinical care settings and healthcare disciplines during clinical pathway development
- High rate of use of the clinical pathway

Bias Awareness

Our goal is to recognize the social determinants of health and minimize healthcare disparities, while acknowledging that unconscious biases can contribute to them.

Order Sets

- IP Croup EBP Pathway

Educational Materials

- There are no educational materials associated with this pathway

Clinical Pathway Preparation

This pathway was prepared by the EBP Department in collaboration with the Croup Clinical Pathway Committee, composed of content experts at Children's Mercy. The EBP department performed a literature analysis to address additional questions posed by the Croup Clinical Pathway Committee. If a conflict of interest is identified, the conflict will be disclosed next to the committee member's name.

Clinical Pathway Representation

This clinical pathway was created with representation from Urgent Care, Emergency Medicine, Pulmonology, and Hospital Medicine.

Croup Clinical Pathway Revision Committee Members and Representation

- Donna Wyly, MSN, RN, APRN, CPNP-AC, PPCNP-BC, ONC | Urgent Care | Committee Co-Chair
- Amanda Nedved, MD | Urgent Care | Committee Co-Chair
- Michelle Dephillips, MD | Emergency Department | Committee Member
- Christine Scoby, DO | Hospital Medicine | Committee Member
- Adrienne Colborg, MD | Pulmonology | Committee Member

EBP Committee Members

- Kathleen Berg, MD, FAAP | Evidence Based Practice
- Andrea Melanson, OTD, OTR/L | Evidence Based Practice

These clinical pathways do not establish a standard of care to be followed in every case. It is recognized that each case is different, and those individuals involved in providing health care are expected to use their judgment in determining what is in the best interests of the patient based on the circumstances existing at the time. It is impossible to anticipate all possible situations that may exist and to prepare a clinical pathway for each. Accordingly, these clinical pathways should guide care with the understanding that departures from them may be required at times.



Clinical Pathway Development Funding

The development of this clinical pathway was underwritten by the following departments/divisions: Urgent Care, Emergency Medicine, Hospital Medicine, Pulmonology, and Evidence Based Practice.

Conflict of Interest

The contributors to the Croup Clinical Pathway have no conflicts of interest to disclose related to the subject matter or materials discussed.

Approval Process

- This pathway was reviewed and approved by the EBP Department and the Croup Clinical Pathway Committee after committee members garnered feedback from their respective divisions/departments.

Review Requested

Department/Unit	Date
Urgent Care	April 2026
Emergency Medicine	April 2026
Hospital Medicine	April 2026
Pulmonology	April 2026
Evidence Based Practice	April 2026

Version History

Date	Comments
February 2016	Version one – <i>Development of algorithms, synopsis, and two literature reviews</i>
November 2022	Version two – <i>Updated to reflect more recent literature on predictors of admission for croup and guidance on observation times following dosing of RE. Algorithms and synopsis were updated. Two order sets were created.</i>
April 2026	Version three – <i>Revised algorithms and updated synopsis. Following a review of the current literature, questions regarding processes were updated or added (symptoms associated with hospital admission for croup, observation time following RE dosing, and the efficacy of a lower dose of dexamethasone).</i>

Date for Next Review

- May 2029

Implementation & Follow-Up

- Once approved, the original pathway was implemented and presented to the appropriate care teams:
 - Announcements made to relevant departments
 - Additional institution-wide announcements were made via the hospital website and relevant huddles
 - Community clinics affiliated with CM received announcements via "Progress Notes."
- Care measurements may be assessed and shared with appropriate care teams to determine if changes need to occur.
- Pathways are reviewed every 3 years (or sooner) and updated as necessary within the EBP Department at CM. Pathway committees are involved with every review and update.

Disclaimer

When evidence is lacking or inconclusive, options in care are provided in the supporting documents and the order set(s) that accompany the clinical pathway.

These clinical pathways do not establish a standard of care to be followed in every case. It is recognized that each case is different, and those involved in providing health care are expected to use their judgment to determine what is in the patient's best interests based on the circumstances at the time.

These clinical pathways do not establish a standard of care to be followed in every case. It is recognized that each case is different, and those individuals involved in providing health care are expected to use their judgment in determining what is in the best interests of the patient based on the circumstances existing at the time. It is impossible to anticipate all possible situations that may exist and to prepare a clinical pathway for each. Accordingly, these clinical pathways should guide care with the understanding that departures from them may be required at times.



It is impossible to anticipate all possible situations and prepare clinical pathways for each. Accordingly, these clinical pathways should guide care, with the understanding that departures may be required at times.

These clinical pathways do not establish a standard of care to be followed in every case. It is recognized that each case is different, and those individuals involved in providing health care are expected to use their judgment in determining what is in the best interests of the patient based on the circumstances existing at the time. It is impossible to anticipate all possible situations that may exist and to prepare a clinical pathway for each. Accordingly, these clinical pathways should guide care with the understanding that departures from them may be required at times.



References

1. Bagwell T, Hollingsworth A, Thompson T, Abramo T, Huckabee M, Chang D, Crawley L, Robbins JM. Management of croup in the emergency department. The role of multidose nebulized epinephrine. *Pediatr Emerg Care*. 2020;36(7):E387-E392. doi:10.1097/PEC.0000000000001276
2. Cuppari C, Barone A, Oretto L, Borgia F, Ceravolo G, Chirico V, Ceravolo A, Sestito S, Concolino D, Nicocia G, Salpietro A, Miraglia Del Giudice M, DeSarro R, Chimenz R, Colavita L. Management of croup in children. *J Biol Regul Homeost Agents*. 2022;36(1 Suppl 1):9-16.
3. Shlomovich M, Hyatt S, Cassel-Choudhury GN. Croup and epiglottitis. *Pediatr Rev*. 2025;46(7):366-372. doi:10.1542/pir.2024-006420
4. Maalouli W, Petersen A, Strutt J, Bergmann K, Axelrod A, Lee G, Hester G. Prediction model for croup admission need. *Hosp Pediatr*. 2022;12(8):711-717. doi:10.1542/hpeds.2021-006389
5. Alshehr M, Almegamsi T, Hammidi A. Efficacy of a small dose of oral dexamethasone in croup. *Biomedical Research*. 2005;65(1):65-72.
6. Aregbesola A, Tam CM, Kothari A, Le ML, Ragheb M, Klassen TP. Glucocorticoids for croup in children. *Cochrane Database Syst Rev*. 2023;1(1):CD001955. Published 2023 Jan 10. doi: 10.1002/14651858.CD001955.
7. Asmundsson AS, Arms J, Kaila R, et al. Hospital course of croup after emergency department management. *Hosp Pediatr*. 2019.9(5).326-332. doi:10.1542/hpeds.2018-0066
8. Bjornson CL, Johnson DW. Croup in children. *CMAJ*. 2013;185:1317-1323
9. Elder AE, Rao A. Management and outcomes of patients presenting to the emergency department with croup. Can we identify which patients can safely be discharged from the emergency department? *J Paediatr Child Health*. 2019.55(11).1323-1328. doi:10.1111/jpc.14412
10. Fifoot AA, Ting JY. Comparison between single-dose oral prednisolone and oral dexamethasone in the treatment of croup: a randomized, double-blinded clinical trial. *Emerg Med Australas*. 2007;19(1):51-58. doi:10.1111/j.1742-6723.2006.00919.x
11. Hancock WC, Scott M, Winer JC. Predictors of inpatient racemic epinephrine use in patients admitted with croup. *Hosp Pediatr*. 2023;13(3):258-264. doi:10.1542/hpeds.2022-006870
12. Hester G, Barnes T, O'Neill J, et al. Rate of airway intervention for croup at a tertiary children's hospital, 2015-2016. *J Emerg Med*. 2019.57(3).314-321. doi:10.1016/j.jemermed.2019.06.005
13. Lima JP, Chowdhury SR, Tangamornsukan W, et al. Adverse events following short-course systemic corticosteroids among children and adolescents. A systematic review and meta-analysis. *JAMA Netw Open*. 2025;8(9): e2534953. doi:10.1001/jamanetworkopen.2025.34953
14. Maalouli W, Hodges JS. Croup admissions. Can we shrink the elephant in the room? *Pediatr Emerg Care*. 2021.37(12).e940-e943. doi:10.1097/PEC.0000000000001829
15. McCans K, Varma S, Ramgopal S, et al. Variation in prehospital protocols for pediatric respiratory distress management in the United States. *Pediatr Emerg Care*. 2022.38(7).e1355-e1361. doi:10.1097/PEC.0000000000002620
16. Parker CM, Cooper MN. Prednisolone Versus Dexamethasone for Croup: A Randomized Controlled Trial. *Pediatrics*. 2019;144(3): e20183772. doi:10.1542/peds.2018-3772
17. Petrocheilou A, Tanou K, Kalampouka E, et al. Viral croup. Diagnosis and a treatment algorithm. *Pediatr Pulmonol*. 2014.49.421-429.
18. Rudinsky SL, Sharieff GQ, Law W, Kanegaye JT. Inpatient treatment after multi-dose racemic epinephrine for croup in the emergency department. *J Emerg Med*. 2015.49(4).408-414. doi:10.1016/j.jemermed.2015.05.031
19. Smith N, Giordano K, Thompson A, DePiero A. Failure of outpatient management with different observation times after racemic epinephrine for croup. *Clin Pediatr (Phila)*. 2018.57(6).706-710. doi:10.1177.0009922817737075
20. Udoh I, Heegeman D, Ravi S. Retrospective evaluation of return rates in pediatric patients treated with inhaled racemic epinephrine for croup. *WMJ*. 2022.121(1).26-29.
21. Woods CR. Croup. Clinical features, evaluation, and diagnosis. *UpToDate*. Accessed April 8, 2026. <https://www.uptodate.com/contents/croup-clinical-features-evaluation-and-diagnosis>
22. Wyly DR, Berg K, Melanson A, et al. Using a clinical pathway to safely reduce transfers and admissions for croup in the urgent care. *Pediatr Emerg Care*. 2025;41(8):635-640. doi:10.1097/PEC.0000000000003396
23. Chub-Uppakarn S, Sangsupawanich P. A randomized comparison of dexamethasone 0.15 mg/kg versus 0.6 mg/kg for the treatment of moderate to severe croup. *Int J Pediatr Otorhinolaryngol*. 2007;71(3):473-477. doi: 10.1016/j.ijporl.2006.11.016

These clinical pathways do not establish a standard of care to be followed in every case. It is recognized that each case is different, and those individuals involved in providing health care are expected to use their judgment in determining what is in the best interests of the patient based on the circumstances existing at the time. It is impossible to anticipate all possible situations that may exist and to prepare a clinical pathway for each. Accordingly, these clinical pathways should guide care with the understanding that departures from them may be required at times.



24. Ortiz-Alvarez O. Acute management of croup in the emergency department. *Paediatr Child Health*. 2017;22:166–173.
25. Bergmann KR, Lefchak B, Nickel A, et al. Variation in organizational clinical practice guidelines for croup. *Hosp Pediatr*. 2023;13:e241–e245.
26. Lefchak B, Nickel A, Lammers S, et al. Impact of clinical guidelines on hospital utilization in children with croup. *Hosp Pediatr*. 2023;13:768–774.

These clinical pathways do not establish a standard of care to be followed in every case. It is recognized that each case is different, and those individuals involved in providing health care are expected to use their judgment in determining what is in the best interests of the patient based on the circumstances existing at the time. It is impossible to anticipate all possible situations that may exist and to prepare a clinical pathway for each. Accordingly, these clinical pathways should guide care with the understanding that departures from them may be required at times.