

# CROUP CLINICAL PATHWAY

## EXECUTIVE SUMMARY

PROVIDER OWNERS: DR. JENN WANG, DR. NANCY KNOWLES, ANGIE HAWK APRN



## Primary Objective

“Viral croup is an acute inflammatory process in response to a viral infection that causes upper airway obstruction (primarily of the subglottic region) resulting in inspiratory stridor, barking cough and in more severe cases respiratory distress. Infection begins in the nasopharynx and spreads to the respiratory epithelium of larynx & trachea. Inflammation and edema of the vocal folds causes hoarseness” (Tyler, 2017). Delayed identification and treatment of Croup can significantly impact patient outcomes, but can be reduced with appropriate screening and medical treatment. The intention of this pathway is to standardize patient evaluation for suspected Viral Croup, expedite appropriate steroid and aerosol treatments, judiciously consult appropriate subspecialty services (ENT), reduce returns to the Emergency Room, Urgent Care, or Clinic within twenty-four hours, and prevent unnecessary treatments or imaging.

Inclusion criteria: Patients between six months and six years of age and previously healthy that present with signs and symptoms of croup. Signs and symptoms may include hoarse voice, barking cough, stridor, retractions, tachypnea or tachycardia (Johnson, 2009).

Exclusion criteria: Patients under six months of age and greater than six years of age, with known airway abnormality, hypotonia, neuromuscular disorder, or symptoms suggestive of alternative diagnosis.

1. Johnson DW. Croup. BMJ Clinical Evidence. 2009;2009:0321
2. Tyler A. Viral croup clinical pathway. Children's Hospital of Colorado 2017. Retrieved from: <https://www.childrenscolorado.org/globalassets/healthcare-professionals/clinical-pathways/croup.pdf>

## Rationale

A Viral Croup pathway will standardize patient evaluation for suspected croup by expediting which medications are used for first and second line to treat croup based on severity of Croup symptoms. The pathway will guide appropriate consults by subspecialty services (ENT). By implementing this pathway workflow in the Emergency Department will be streamlined and will reduce the time from triage to steroid and nebulizer administration, guide disposition of patient, and decrease number of patients returning to the Emergency Department, Urgent Care or Clinic. By implementing this pathway workflow in the Urgent Care and Physicians Clinic area, care delivery will be streamlined and will increase the use of the Croup Smart Set, guide disposition of patient, and decrease number of patients returning to the Emergency Department, Urgent Care or Clinic. Barriers that could be expected are non-compliance with the pathway, delays as people become more educated and accustomed to using the pathway, incorrect diagnosis of the patient, and availability of the medications in the various sites may also be barriers.

## Metrics

### Emergency Department:

1. Decrease return to ED within 72 hours for patients with diagnosis of Croup.
2. Decrease time from patient triage to Dexamethasone administration for patients with a diagnosis of Croup.
3. Decrease time from patient triage to Racemic epinephrine administration for patients with a diagnosis of Croup with triage score of 2 (stridor at rest) or higher.

### Outpatient:

1. Decrease return to ED/CP/UC within 72 hours for patients with diagnosis of Croup.
2. Utilization of the Croup Pathway during the initial evaluation and medical management. Will measure based on use of Croup Order set/Smart set for patients with diagnosis of Croup.

**Date Last Reviewed: 5/18/2020**

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3. Decrease the use of Viral PCR testing in patients with diagnosis of Croup.

### Balancing Metric:

1. Missing additional respiratory diagnoses (e.g. bacterial tracheitis/epiglottitis).

## Evidence

### Severity Assessment

Standard severity assessment of viral croup has been associated with decrease in admissions, increase in appropriate medical interventions, decrease in LOS, and decrease in return to ED. Mild severity is generally categorized as minimal stridor, barking cough, suprasternal retractions only, and ability to talk or feed comfortably. Moderate severity of croup is inspiratory stridor at rest, intracostal and suprasternal retractions at rest, and difficulty talking or feeding. Severe to Life-Threatening croup presents as biphasic stridor or absence due to poor respiratory effort, severe retractions, hypoxemia or cyanosis, unable to talk or feed.

1. Bjornson C.L. & Johnson D.W. Croup in children. *CMAJ* 2013;185: 1317-1323. doi: 10.1503/cmaj.121645
2. Tyler A., McLeod L., Beaty B., Juarez-Colunga E., Birkholz M., Hyman D., Kempe A., Todd J., Dempsey A.F. Variation in inpatient croup management and outcomes. *Journal of Pediatrics* 2017;139: e20163582, 1-10

### Dexamethasone

The use of dexamethasone has been shown effective in the Croup patient population. It has reduced symptoms of croup, reduced length of stay, reduced rate of return visits to the Emergency Department, and reduced intubation rates. We recommend one time dosing of Dexamethasone at 0.6 mg/kg. It has not been shown that prednisolone and low-dose dexamethasone have difference in efficacy of treatment of Croup patients as compared to 0.6 mg/kg dosing.

1. Chub-Uppakarn S.A., Sangsupawanich P. A randomized comparison of dexamethasone 0.15mg/kg versus 0.6mg/kg for the treatment of moderate to severe croup. *International Journal of Pediatric Otorhinolaryngology* 2007; 71: 473-7.
2. Dobrovoljac M. & Geelhoed G.C. 27 years of croup: an update highlighting the effectiveness of 0.15 mg/kg of dexamethasone. *Journal of Emergency Medicine Australia* 2009; 21, 309-14 doi: 10.1111/j.1742-6723.2009.01202.x
3. Fifoot A.A. & Ting J. YS. Comparison between single-dose oral prednisolone and oral dexamethasone in the treatment of croup: a randomized, double-blinded clinical trial. *Journal Emergency Medicine Australia* 2007. Doi: 10.1111/j.1742-6723.2006.00919.x
4. Gates A., Gates M., Vandermeer B., Johnson C., Hartling L., Johnson D.W., Klassen T.P. Glucocorticoids for croup in children (review). *Cochrane Database of systematic reviews* 2018: 8.

### Racemic Epinephrine

Racemic epinephrine has been shown to reduce the symptoms of croup within thirty minutes. Racemic epinephrine is administered as 0.05 mL/kg per dose given via a nebulizer over fifteen minutes. Repeated doses may be warranted for children with moderate to severe distress.

1. Bjornson C, Russell K, Vandermeer B, Klassen TP, Johnson DW. Nebulized epinephrine for croup in children. *Cochrane Database of Systematic Reviews* 2013; 10; CD006619

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2. Up to Date: Management of Croup. Accessed April 2020: [https://www.uptodate.com/contents/management-of-croup?search=croup&source=search\\_result&selectedTitle=1~70&usage\\_type=default&display\\_rank=1#H94978](https://www.uptodate.com/contents/management-of-croup?search=croup&source=search_result&selectedTitle=1~70&usage_type=default&display_rank=1#H94978)

## Recommendations/Goals

1. Develop a standard initial evaluation and treatment plan to provide evidence-based care while improving time to administration of dexamethasone and racemic epinephrine based on clinical assessment, as well as patient disposition.
2. Standardize patient disposition with mild, moderate or severe Croup, as well as appropriate ENT consultation.

## Implementation Items

1. Croup Pathway Emergency Department Algorithm
2. Croup Children's Physicians & Urgent Care Algorithm
3. Revision of Children's Physicians & Urgent Care Smart set

## Team Members

Dr. Jenn Wang, Interim Clinical Service Chief, Emergency Department

Angie Hawk, APRN Emergency Department

Meghan Spencer, Nurse Informaticist

Denise Packard, Respiratory Therapist

Chelsey Marion, Respiratory Therapy

Dr. Chris Youngman, Medical Director Children's Physicians

Dr. Nancy Knowles, Quality Manager Children's Physicians

Dr. David Tolo, Clinical Service Chief, Urgent Care

Amy Vacek, Quality and Patient Safety Nurse

Date Last Reviewed: 5/18/2020