

### Inclusion Criteria:

- Age 6 months to 6 years
- [Signs & Symptoms](#) of croup

### Impending Respiratory Failure?

*Combination of poor respiratory effort, hypoxia, cyanosis, or mental status changes*

**Transfer to ED  
via EMS**

**Off Pathway**

### Exclusion Criteria:

- Toxic appearance
- Symptoms suggestive of an [alternative diagnosis](#)
- Known upper airway abnormality
- Hypotonia or neuromuscular disorder
- Chronic lung disease (BPD, CF, pulmonary artery hypertension)
- Recent airway instrumentation
- Congenital or acquired heart disease
- Foreign body aspiration or ingestion

### Determine Severity

|                           | Mild                        | Moderate                                                       | Severe                   |
|---------------------------|-----------------------------|----------------------------------------------------------------|--------------------------|
| Mental status             | Normal                      | Anxious                                                        | Anxious or lethargic     |
| Stridor                   | Minimal or none at rest     | Inspiratory stridor at rest<br>Biphasic stridor with agitation | Biphasic stridor at rest |
| Work of breathing         | Minimal or none             | Moderate                                                       | Severe                   |
| Heart & Respiratory Rates | Normal or slightly elevated | Moderately elevated                                            | Significantly elevated   |
| Oral intake               | Normal                      | Decreased                                                      | Unable to feed           |

[Dexamethasone](#)

[Dexamethasone &  
Racemic epinephrine](#)

### [Treatments Not Recommended](#)

### Discharge Criteria:

- Minimal or no stridor at rest
- Minimal or no retractions
- Able to tolerate PO

**Discharge  
home**

Meets  
discharge  
criteria?

Yes

No

**Transfer to ED**

No  
(2 hours of  
observation)

Stridor at rest and  
moderate-severe  
distress?

Yes

- **Initiate Transfer to ED  
via EMS**
- [Racemic epinephrine](#)

# Signs & Symptoms

Croup is a common respiratory illness of the larynx, trachea, and bronchi that leads to **inspiratory** stridor and a barking cough. It is usually caused by a virus. Croup is primarily a clinical diagnosis, with typical findings of abrupt onset of a barking cough, inspiratory stridor, hoarseness, and sometimes dyspnea and fever. Biphasic stridor, when present, may represent more severe disease.

[Algorithm](#)

# Differential Diagnosis

## Signs and symptoms suggestive of an alternative diagnosis:

- Age < 6 months or > 6 years
- Expiratory wheeze
- Drooling or difficulty swallowing
- Prolonged or recurrent stridor
- Recurrent croup (2<sup>nd</sup> episode within 30 days or > 3 episodes in the last 12 months)
- Toxic appearance
- Poor response to treatment
- Asymmetry of respiratory exam
- Non-elective intubation in the past 6 months or history of prolonged intubation

## Alternative Diagnoses:

### Bacterial tracheitis

- Signs/symptoms of croup that have markedly worsened, toxic appearing, poor response to racemic epinephrine

### Epiglottitis

- Incomplete immunizations, absence of barking cough and presence of anxiety that is out of proportion to degree of respiratory distress, fever, toxic appearing, drooling, swelling of epiglottis “thumb sign” on lateral radiograph

### Foreign body aspiration

- History of choking in previously healthy child

### Large airway lesions, hemangioma, neoplasm

- Chronic course and absence of fever

### Known upper airway abnormality

- Vocal cord paralysis, subglottic stenosis, tracheomalacia, history of vascular ring or TEF

### Deep neck space abscesses (peritonsillar abscess, retropharyngeal abscess, parapharyngeal abscess)

- Fever, drooling, neck stiffness, lymphadenopathy and varying degrees of toxicity, barking cough absent

### Thermal injury/smoke inhalation

### Asthma

- Lower airway sounds rather than stridor

### Anaphylaxis or Angioedema

- Rapid onset without antecedent URI symptoms or fever

[Algorithm](#)

# Recommended Treatments

**Dexamethasone** (0.6 mg/kg, max 16 mg) PO, IV, IM should be administered by the least invasive route possible.

**Racemic epinephrine** (0.5 mL of a 2.25% solution diluted to 3 mL total volume with normal saline) should be given to all patients with moderate-severe croup.

Onset: 10-30 minutes

Can be repeated after 20 minutes if symptoms persist

Duration: 1-2 hours

**Consider ENT consultation / referral:**

- Recurrent croup (2<sup>nd</sup> episode within 30 days or > 3 episodes in the last 12 months)
- Atypical croup (crescendo onset, age < 6 months or > 6 years)
- Recent non-elective intubation
- History of prolonged intubation

[Algorithm](#)

# Treatments Not Routinely Recommended

**Radiographs:** not indicated in the vast majority of children with croup. Imaging is indicated in the following circumstances:

- Atypical course and diagnosis is not clear
- Severe symptoms without adequate response to therapeutic interventions
- Concern for inhaled foreign body
- Recurrent episodes of croup

**Viral testing:** not routinely necessary but may be useful when making decisions about isolation

**Cool mist:** lack of proven benefit but may be used if comforting to the child

**Repeat dexamethasone:** not routinely recommended unless symptoms persist

[Algorithm](#)

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**Algorithm**

# Team & Process

## Content Development Team:

### Leaders:

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This pathway was adapted from the Emergency Department version of the Croup pathway. Please see the ED Croup Clinical Pathway document for the original list of pathway members

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## Clinical Pathway Development

This clinical pathway was developed using the process described in the NCH Clinical Pathway Development Manual Version 6, 2022. Clinical Pathways at Nationwide Children's Hospital (NCH) are standards which provide general guidance to clinicians. Patient choice, clinician judgment, and other relevant factors in diagnosing and treating patients remain central to the selection of diagnostic tests and therapy. The ordering provider assumes all risks associated with care decisions. NCH assumes no responsibility for any adverse consequences, errors, or omissions that may arise from the use or reliance on these guidelines. NCH's clinical pathways are reviewed periodically for consistency with new evidence; however, new developments may not be represented, and NCH makes no guarantees, representations, or warranties with respect to the information provided in this clinical pathway.

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[Algorithm](#)

# Goals & Metrics

## Goal

To appropriately diagnose and effectively treat patients with croup.

## Population

### Inclusion:

- Age:  $\geq 6$  months to  $\leq 6$  years.
- Diagnoses:  
Patients presenting to the UC with a diagnosis of croup (can use a SNOMED concept for this) or who received a racemic epinephrine treatment.
- Care Setting: UC

### Exclusions:

- Congenital heart disease
- BPD
- Cystic fibrosis

## Metrics:

### Process measures:

- ED/UC Order Panel & SmartSet utilization

### Outcome measures:

- UC length of stay
- Time from racemic epinephrine administration to discharge disposition.
- Transfer rate

### Balancing measure:

- 72hr ED/UC bounce back rate

[Algorithm](#)