

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

Activate Difficult Airway Team

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 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

2 hours of observation

No

Stridor at rest and moderate-severe distress?

Yes

[Racemic epinephrine](#)
If at urgent care, consider prompt transfer to ED

Stridor at rest and moderate-severe distress?

Yes

[Racemic epinephrine](#)

- Consider [heliox](#) for severe respiratory distress without hypoxia
- Consider alternative diagnoses

Admit to Infectious Diseases or Hospital Peds versus PICU based on criteria

Admission Criteria

Inpatient (HP or ID)

- Hypoxia
- Stridor at rest
- ≥ 3 doses of racemic epinephrine needed to manage respiratory distress

PICU

- Need for [heliox](#)
- Respiratory failure requiring NIPPV or intubation

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.

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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 (2nd 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

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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

Heliox is a mixture of helium (70-80%) and oxygen (20-30%) that promotes laminar flow of air rather than turbulent flow. When administered via a non-rebreather mask heliox can decrease the work of breathing in children with severe symptoms. Use of heliox is limited in children with hypoxia because of the low fractional concentration of oxygen in the gas mixture.

Consider ENT consultation / referral:

- Recurrent croup (2nd 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

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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

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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, 2025. 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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Goals & Metrics

Goal

To appropriately diagnose and effectively treat patients with croup.

Population

Inclusion:

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

Exclusions:

- Congenital heart disease
- BPD
- Cystic fibrosis

Metrics:

Process measures:

- ED/UC Order Panel & SmartSet utilization

Outcome measures:

- ED length of stay
- Time from racemic epinephrine administration to discharge disposition.
- Admission rate
- Percent of non-ICU admitted patients who do not receive supplemental oxygen AND do not receive additional racemic epinephrine treatments.

Balancing measure:

- 72hr ED/UC bounce back rate

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