Croup Clinical Pathway

Disclaimer

This clinical pathway is intended to provide general guidance and should not replace clinical judgment. It is meant to assist licensed practitioners and other health care providers in clinical decision-making by describing a range of generally acceptable approaches to the diagnosis and management of a particular condition. A particular patient's circumstances should always be taken into account when a practitioner is deciding on a course of management. This clinical pathway is current as of the date of publication and will be reviewed periodically to align with any updated best practices or evidence; however, new development may not be represented in the published version. The treating practitioner assumes all risks associated with care decisions. Phoenix Children's accepts no liability for the content of this clinical pathway or the outcomes a patient might experience where a practitioner consulted the content of this clinical pathway.

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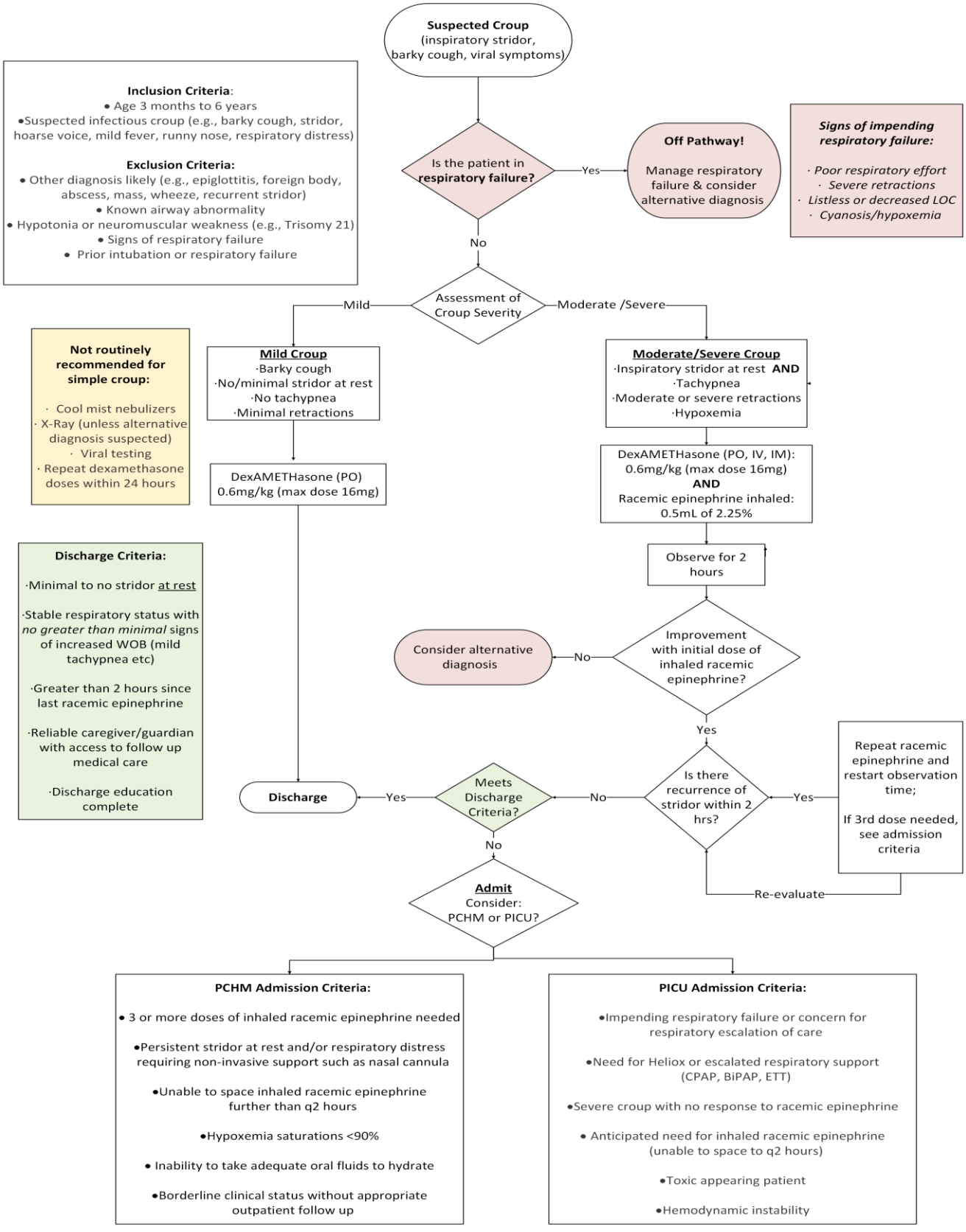
Pathway Flow Diagram



Scope

Definition of Croup (acute viral laryngotracheobronchitis): Signs and symptoms in a previously healthy child or a virally induced respiratory illness that is associated with a barky cough and inspiratory stridor[30,31,32].

Inclusion Criteria:

1. Hospitalized children, including admission and observation status, ages 3 months to 6 years
2. Signs and symptoms consistent with diagnosis of infectious croup: Sudden onset of “barky” cough, Inspiratory stridor, Respiratory distress, Hoarse voice, Runny nose and/or Low-grade fevers

Exclusion Criteria:

1. Signs and symptoms suggestive of an alternative diagnosis:
    a. Acute Bacterial Tracheitis: High fevers, toxic appearance, and/or poor response to racemic epinephrine inhaled solution
    b. Epiglottitis: Drooling or difficulty swallowing, sudden onset of high fevers, absence of “barky” cough, anxious appearing and/or sitting forward in “sniffing” position
    c. Suspicion for a foreign body
    d. Suspicion for a retropharyngeal abscess
    e. Suspicion for an airway mass/tumor
    f. Expiratory wheezing
    g. Prolonged or recurrent stridor
2. Known upper airway abnormality:
    a. Tracheomalacia
    b. Laryngomalacia
    c. History or suspicion for tracheoesophageal fistula
    d. History or suspicion for vascular ring/sling
3. Hypotonia or neuromuscular disorder associated with hypotonia (e.g. Trisomy 21)
4. Pending or actual respiratory failure
    a. Poor respiratory effort
    b. Listlessness or decrease LOC
    c. Cyanosis and/or hypoxemia
    d. Need for ICU
5. History of prior intubation and/or respiratory failure

Pathway Goals

1. To decrease the need for unnecessary imaging or testing for patients with croup
2. To minimize the use of nebulized racemic epinephrine inhaled solution to only when clinically indicated
3. To minimize the use of additional steroids beyond the initial dose of dexamethasone to only when clinically indicated
4. To minimize the need for unnecessary hospitalizations
5. To decrease length of stay by outlining clear discharge goals

Key Clinical Recommendations with Evidence Based Supporting Material

1. Oral steroids are indicated in all ALL children presenting with croup. This is most conveniently achieved with a dose of oral DexAMETHasone (0.6 mg/kg to a maximum of 16 mg) [1,2].
    a. The type of oral steroid (DexAMETHasone versus PrednisoLONE /predniSONE) used does not significantly impact health outcomes or change resources needing to be utilized over the course of illness[3 4,5 6,7]. As such, DexAMETHasone (in tablet form) is the preferred drug of choice because of its low cost and ease of administration.
    b. Nebulized budesonide (2 mg) offers no significant benefit from oral steroids but can be a safe and effective alternative if patients are not able to tolerate oral medications or enteral medications contraindicated [8 9,10].
    c. Early administration of oral steroids improves patient outcomes [11].
    d. There is no need for additional steroids on discharge[8,12,13,14].

2. Nebulized racemic epinephrine (2.25%, 1 unit dose, 0.5 mL in 3 mL NS) should be reserved for moderate to severe croup defined as stridor <u>at rest</u> AND one or more of the following symptoms: tachypnea, retractions/increased work of breathing, agitation, restlessness, fatigue, difficulty speaking or trouble with feeds [15,16].
    a. The treatment effect from racemic epinephrine disappears after ~2 hours, so observation of symptoms is indicated for at least two hours after the last treatment is given.
    b. There is no role for safe use of nebulized racemic epinephrine upon discharge at home.
    c. Fewer than 25% of patients admitted with croup require additional racemic epinephrine inpatient[17,18,19,20].
3. Patients requiring corticosteroids and multidose nebulized epinephrine are less likely to return for further care if discharged from the ED, but more likely to require admission[22].
4. Most children with croup demonstrate a rapid and significant improvement in symptoms after administration of nebulized racemic epinephrine. Consider further workup for an alternative diagnosis and removal from the Croup Clinical Pathway if there is no improvement following nebulized racemic epinephrine.
5. Hypoxemia and/or Cyanosis is uncommon in otherwise healthy children with croup and should be viewed as a warning sign for impending respiratory failure.
6. Radiographs (lateral neck and/or CXR) are not routinely indicated for croup with typical presentation but can be potentially helpful with possible alternative diagnosis and/or children not responding to usual therapy for croup[23,24,25].

7. Routine viral studies (PCR, cultures, DFA) are not routinely indicated for croup[24,25].
8. There is no evidence to support cool mist humidification for hospital treatment of croup[,26,27,28].
9. Westley scoring system for croup has been used to try and classify severity of illness. However, there is insufficient evidence to support its use as a validated tool to be reliably used to predict outcomes that can be used to triage patients. At best, studies support that patients with lower Westley Scores (≤2) are more likely to be able to be discharged home from the ED, whilst patients with higher Westley Scores (≥6) are more likely to requiring longer stays in the ED and/or require admission [29]. Westley Scores should not be used in replace of clinical judgement.

Medication Recommendations

1. A single dose of steroid is recommended for ALL children presenting with croup
    a. First line: DexAMETHasone oral, 0.6 mg/kg (maximum of 16 mg)
        - Alternatives: If patients are unable to tolerate oral DexAMETHasone, consider IM or IV DexAMETHasone
        - Consideration for nebulized budesonide 2mg once if unable to tolerate DexAMETHasone
    b. PrednisoLONE/PrediSONE, 1-2 mg/kg daily for 3 days (maximum 60mg/day)
    c. MethylPREDNISolone intravenous, 0.5 mg/kg every 6 hours (maximum 15mg/dose for up to 3 days)

2. Nebulized racemic epinephrine (2.25%, 1 unit dose, 0.5 mL in 3 mL NS) reserved for moderate to severe croup defined as stridor at rest AND one or more of the following symptoms:
    a. Tachypnea
    b. Retractions/increased work of breathing
    c. Agitation
    d. Restlessness
    e. Fatigue
    f. Difficulty speaking
    g. Dysphagia/trouble with feeding

Admission Criteria

When should the patient be admitted to the hospital?

1. Persistent stridor at rest AND any of the following symptoms: tachypnea, retractions/increased work of breathing, agitation, restlessness, fatigue, difficulty speaking or trouble with feeds
2. Continue clinical symptoms after receiving 3 or more doses of racemic epinephrine in pre-hospital setting (includes all facilities within a 24-hour period)
3. Hypoxia with room air saturations <90%
4. Inability to take adequate oral fluids to support hydration
5. Concern over the ability of the child to be cared for at home or with concerns for ability to follow-up as an outpatient
6. Admission status assignment to be determined by admitting service and/or case management

Discharge Criteria

What are the discharge criteria for the patients on this pathway?

1. No signs or symptoms of significant respiratory distress
2. Minimal to no stridor at rest
3. No supplemental oxygen for >4 hours
4. Greater than 2 hours since last racemic epinephrine
5. Age-appropriate ability to talk and take adequate oral intake to support hydration needs
6. Responsible care giver/guardian to continue supportive care at home with reliable follow up
7. Discharge education complete

Patient and Family Education/Discharge Planning

1. Begin discharge education upon presentation to the ED and subsequent admission
    a. Review Croup education with care giver/guardian and teach signs of worsening respiratory distress and signs of inadequate oral intake/dehydration
    b. Review who to contact with questions or concerns, reasons to call a physician and/or return to the ED
2. Educate families on expected length of stay, which is typically 12-36 hours from admission. Review the discharge goals with family and explain that discharge is contingent on meeting these goals (ex: not time bound with goals)
3. Involve case management and/or social work upon admission “if” special needs exist that may be expected or issues that could delay discharge

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Pathway Champions & Committee Approvals

Hospital Medicine Division: Joseph Mangone DO MPH, Iris Marku PNP, Katherine Dyer DO

Emergency Division: Kaleena Patel MD MHQS

PICU: Eunice Yoon MD MPH

Pulmonology: James Woodward MD

ENT: Stuart Curtis MD

Nursing: Nicole Smith BSNRN, Nancy Walsh BSN RN CPN

Respiratory Therapy: Cari Newell RT, Jeff Kuls RT

Approved by Pharmacy & Therapeutics Committee: 12/17/2025

Approved by Clinical Effectiveness Committee: 2/1/2014, 1/15/2026