# Clinical Pathway
## Croup
Updated: December 2012

### Outcomes/Goals
1. Identification and treatment of pediatric patients with croup
2. Create a team-oriented approach to treatment and care
3. Identify and distinguish mild, moderate and severe croup and prevent impending respiratory failure

### NURSE Documentation
Chief complaint. Onset of symptoms, alleviating/contributing factors, appearance, lung sounds, work of breathing, retractions, pulses, skin temperature/fever. Assess for possibility of FB.

### INTERVENTIONS
**Initiate on arrival**
- Full set of vitals per standard of care. Minimize interventions for moderate and severe croup (see algorithm)
- Determine severity of exacerbation *
- Continuous pulse oximetry for moderate and severe croup. Spot check SaO2 for mild croup.
- Initiate oral Dexamethasone for mild and moderate severity.
- Oxygen if cyanosis or SaO2 <93% present
- Racemic epi for stridor at rest – Use mask for neb delivery if severe symptoms
- Mist therapy (saline nebs) not recommended for any severity category

### DIAGNOSTICS
Consult with LIP for indications before ordering. May include:
- Chest x-ray
- Soft tissue neck x-ray

### PHYSICIAN (LIP)
**Medication**
- Oral Dexamethasone 0.6 mg/kg (parental if not able to tolerate po safely)
  *Maximum dose 10mg*

**Inhalation therapy**
- Nebulized racemic epinephrine 2.25% (0.5 ml in 2.5 ml Saline)
  - May repeat racemic epinephrine x 1. If 3rd dose needed consider differentials and inpatient admission.
  - If continued racemic needed consider heliox

**Rehydration**
- Evaluate/encourage oral rehydration as appropriate for mild croup
- NPO for moderate/severe croup until persistent mild symptoms

**Radiology**
- Consider imaging to exclude alternate diagnoses for all children that receive racemic epi, do not respond to treatment, or present with high fever

### ADMISSION
- Call primary care physician
- Call peds ward/PICU attending
- Prepare family/infant for admission to OBS, PICU or ward as appropriate

### Severity Assessment*

<table>
<thead>
<tr>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Impending Respiratory Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occasional barky cough, no audible stridor at rest and no to mild suprasternal and/or intercostal retractions</td>
<td>Frequent barky cough, easily audible stridor at rest, suprasternal and sterna wall retraction at rest but little or no distress or agitation</td>
<td>Frequent barky cough, prominent inspiratory and occasionally expiratory stridor, marked sterna retractions, significant distress and agitation</td>
<td>Change in mental status Fatigue Llistlessness Agitation Pallor Dusky appearance Decreased retractions Decreased breath sounds with decreasing stridor</td>
</tr>
</tbody>
</table>

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*Severity Assessment based on clinical symptoms and response to treatment.*
Clinical Pathway Decision Making Process
Croup
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**MILD**
(without stridor or significant retractions at rest)
- Oral Dexamethasone
- Parent/Caregiver education
- Anticipated course of illness
- Signs of respiratory distress
- When to seek medical assessment
- Spot check SaO2
- Discharge home

**MODERATE**
(stridor and retractions at rest **without** agitation)
- Minimize interventions
- Place child on parent’s lap/arms
- Position for comfort
- Continuous pulse oximetry monitoring
- Oral Dexamethasone 0.6 mg/kg
- Racemic epi 2.25%
  - (0.5 ml in 2.5mL Saline)
- Improvement?
- Stridor/retractions resolved
  - Educate parents (as for mild croup)
  - Discharge home if no stridor at rest after 2 hours of observation
- No or minimal improvement by epi neb, repeat neb, consider differentials, and **consider hospitalization**
  - Good response to nebulized epinephrine
    - Observe for 2 hours
  - No or poor response to nebulized epinephrine
    - Repeat nebulized epinephrine 2.25%
      - (0.5 ml in 2.5 mL Saline)
      - Consider heliox
- **Persistent mild symptoms**
  - No recurrence of retractions/stridor at rest
  - Provide education
  - Discharge home
- **Recurrence of severe respiratory distress**: Repeat nebulized epinephrine
  - If good response continue to observe
  - Discharge home

**SEVERE**
(stridor and retractions associated with agitation or lethargy)
- Minimize intervention
- Provide oxygen
- Continuous pulse oximetry monitoring
- Nebulized epinephrine
  - Racemic epi 2.25%
    - (0.5 ml in 2.5 mL Saline)
  - Oral Dexamethasone
- Improvement?
- Stridor/retractions resolved
  - Educate parents (as for mild croup)
- Discharge home if no stridor at rest after 2 hours of observation
- No or poor response to nebulized epinephrine
  - Repeat nebulized epinephrine 2.25%
  - Consider heliox
- **Continued stridor, retractions or poor response to epinephrine**
  - Contact pediatric ICU for further management/consult

**Cool mist therapy** is not recommended

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- **Consider hospitalization** (obs/general ward) if:
  - Received steroid >4 hours ago
  - Continued **moderate** respiratory distress **without** agitation or lethargy (stridor at rest/retractions)
# Croup Rationale and Data

## Goals of Clinical Pathway

1. Identification and treatment of pediatric patients with croup
2. Create a team-oriented approach to treatment and care
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<tr>
<th>Data Considerations</th>
<th>Interventions</th>
<th>Rationale</th>
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<tr>
<td>Steroids</td>
<td>Dexamethasone</td>
<td>Single dose oral Dexamethasone is indicated in all children diagnosed to have croup including those with only a barky cough without any other signs of respiratory distress (Ausejo, Bjornson 2006) Dexamethasone may be administered orally in all but those children with very severe croup, is rapidly absorbed with less than 5% of children vomiting the drug (Klassen, Duggan)</td>
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| Diagnostics         | Lab and radiology | Laboratory and radiological assessments are not necessary to make the diagnosis of croup. Reliable diagnosis can be made by clinical presentation in combination with a thorough history and physical exam. Viral cultures or rapid antigen tests do not aid in routine management of patients and add unnecessary and potentially counterproductive additional stimuli. Radiological assessment may be helpful for ruling out FB, bacterial tracheitis, or retropharyngeal abscess for moderate and severe symptoms that do not respond to treatment (Chin 2002) |

| Monitoring          | Pulse Oximetry, Observation | Pulse oximetry is indicated in children with moderate to severe croup. Continuous monitoring is not essential in patients with mild croup (Margolis, Newth, Chin 2002) Children should not be discharged with less than 2 hours of observation following administration of epinephrine (Westley, Cornell, Ausejo, Rizos, Kunkel, Kelley) |

## Differential Diagnosis considerations

- **Bacterial tracheitis**: High fever, toxic appearance and poor response to epinephrine
- **Epiglottitis**: Sudden onset, high fever, absence of barky cough, dysphagia, drooling, anxious appearance, sniffing position
- **Foreign body, retropharyngeal abscess and hereditary angioedema**: less common but additional causes of stridor which should be considered

## Indications for Admission

**Absolute**
- Significant respiratory compromise persisting 4 or more hours after treatment with corticosteroids
- Continued audible stridor at rest following treatment

**Relative**
- Inadequate access to medical care (lives long distance from hospital, transportation concerns)
- Concerns for inadequate observation or follow-up
- Significant parental anxiety
- Recurrent ED visit within 24 hours

## Criteria for Discharge from ED (Chin, Wegener 2002)

- Presence of mild symptoms either on initial evaluation or after a period of observation
- Recommended 2 hours of observation (or provider discretion) following administration of epinephrine
- Reliability of parents/caregivers to return/seek medical care if respiratory distress recurs at home

## Croup Severity Assessment

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Reviewed: ED pediatric nurse committee, PEM committee 12/12