CLINICAL GUIDELINE FOR THE MANAGEMENT OF VIRAL LARYNGO-TRACHEOBRONCHITIS (CROUP)

1. Aim/Purpose of this Guideline
   1.1. This guideline applies to all nursing and medical staff caring for an Infant/Child with Croup.
   It affects all infants, children and their families requiring management of Croup.

2. The Guidance
   2.1 Viral croup is the most common form of upper airway obstruction in children aged 6 months to 6 years.

Aetiology

Usually Para Influenza I, II or III
Adenovirus
Influenza A and B

Diagnosis

Viral prodrome 1 – 2 days
Harsh barking cough
Hoarse voice and stridor
Fever < 38°

Differential Diagnosis

1. Epiglottitis
2. Bacterial tracheitis

These patients are usually more toxic with temperature > 38° and often drool.

(If either of these diagnoses are suspected early consultation with the consultant paediatrician on call, ENT and the on call anaesthetist should be undertaken).

Signs

- Tachypnoea
- Tachycardia
- Tracheal tug
- Cyanosis on crying
- Stridor worse on lying down
- +/- confusion
- +/- drowsiness
- +/- sternal recession
Severity assessment

The severity of croup is often determined by the Westley croup score, the presence of chest wall retractions and stridor at rest are the two most critical clinical features.

**Westley croup score**

Each element is assigned a score, as illustrated below:

- Level of consciousness: Normal, including sleep = 0; disoriented = 5
- Cyanosis: None = 0; with agitation = 4; at rest = 5
- Stridor: None = 0; with agitation = 1; at rest = 2
- Air entry: Normal = 0; decreased = 1; markedly decreased = 2
- Retractions: None = 0; mild = 1; moderate = 2; severe = 3

The total score ranges from 0 to 17.

- Mild croup is defined by a Westley croup score of 2. Typically these children have a barking cough, hoarse cry, but no stridor at rest. Children with mild croup may have stridor when upset or crying (i.e., agitated) and either none, or only mild chest wall/subcostal retractions.

- Moderate croup is defined by a Westley croup score of 3 to 7. Children with moderate croup have stridor at rest, at least mild retractions, and may have other symptoms or signs of respiratory distress.

- Severe croup is defined by a Westley croup score of 8. Children with severe croup have significant stridor at rest, although stridor may decrease with worsening upper airway obstruction and decreased air entry. Retractions are severe (including drawing in of the sternum) and the child may appear anxious, agitated, or fatigued. Prompt recognition and treatment of children with severe croup are paramount.

**Children who need immediate medical attention or further evaluation include those who have:**

- Stridor at rest.
- An abnormal airway (e.g., subglottic narrowing from care in the neonatal intensive care unit).
- Previous episodes of moderate to severe croup.
- Medical conditions that predispose to respiratory failure (e.g., neuromuscular disorders).
- Rapid progression of symptoms (i.e., symptoms of upper airway obstruction after less than 12 hours of illness).
- Inability to tolerate oral fluids.
- Parental concern that cannot be relieved by reassurance.
- Prolonged symptoms (more than three to seven days) or an atypical course (perhaps indicating an alternative diagnosis).

Monitor

- RR
- HR
- SaO₂
- Hydration
- Level of consciousness
- Stridor
- Recession
- Air entry

Avoid doing anything that distresses the child
e.g.  
  a. Inserting IV cannula
  b. Using tongue depressor

Investigation

- Minimise investigations.
- Lateral neck x-rays are not indicated as they are not a reliable indicator of disease severity.
- Avoid blood gases unless intubated.
- Chest x-ray is rarely required, but if indicated, use of a portable chest x-ray is recommended.

Management

General

1. Avoid doing anything that may distress the child -
   e.g. Inserting IV cannula
   Or using tongue depressor
   Or inserting NG Tube
2. Encourage good hydration
3. High humidity environments such as mist tents do not influence recovery rate

Steroids

Systemic dexamethasone and nebulised Budesonide are equally effective in reducing symptoms oral dexamethasone is less expensive and likely to distress the infant less so is the first line of treatment. Nebulised budesonide is the treatment of choice in the vomiting
infant. Oral prednisolone 1-2 mg/kg could be used if oral dexamethasone is not readily available.

Dexamethasone 150 micrograms/kg then review requirement for further 12 hourly doses either in hospital if still an in-patient or by GP if still has croup.

Budesonide 2 mg nebulised stat if vomiting.

Observation
Mild croup

Children with mild croup who are tolerating fluids may be sent home after evaluation and a single dose of oral dexamethasone (randomized controlled trials have demonstrated that treatment with a single dose of oral dexamethasone may reduce the need for review, shorten the course, improve duration of the child’s sleep, and reduce parental stress in children with mild croup). The caregiver needs to receive instructions regarding home care and indications to seek further medical attention including:

- Difficulty breathing
- Pallor or cyanosis
- Severe coughing spells
- Drooling or difficulty swallowing
- Fatigue
- Worsening course
- Fever (>38.5°C)
- Prolonged symptoms (longer than seven days)
- Stridor at rest
- Suprasternal retractions

Moderate croup

Children with moderate croup should be observed after pharmacologic intervention. During the observation period, children should be encouraged to drink. Children who received dexamethasone and remain symptomatic may need to be observed for at least four hours before deciding whether they require hospital admission or can go home (as the effect of dexamethasone may not be apparent for several hours).

Indicator of Increasing Severity

1. Increasing respiratory rate
2. Diminished air entry on auscultation
3. Cyanosis at rest with SaO₂ < 93% in air
4. Altered level of consciousness
5. Sternal recession

Indications for admission to HDU/ITU and Intubation under anaesthesia

1. Poor air entry
2. Cyanosis
3. Altered level of consciousness
Management

1. Call anaesthetist, Consultant Paediatrician and ENT Surgeon
2. Administer humidified Oxygen to keep SaO₂ > 93-95%
3. Deliver nebulised Adrenaline via face mask.
   - 400mcg/kg (maximum dose 5mg) of 1 in 1000 Adrenaline(1mg/ml) diluted to 2-3 ml with NaCl 0.9% while closely monitoring ECG and SaO₂, (discontinue if HR > 200 beats/minute). This will produce a transient improvement which normally lasts for about 2-3 hours so will buy time in order to organise an ITU/HDU bed. The dose of adrenaline can be repeated after 30 minutes if necessary.

<table>
<thead>
<tr>
<th>Clinical Signs</th>
<th>Assessment</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>No stridor at rest, Mild chest retractions + SaO₂ &gt; 93%</td>
<td>Mild</td>
<td>Oral Dexamethasone Send home</td>
</tr>
<tr>
<td>With Stridor at rest, chest retractions and/or SaO₂ &lt; 93%</td>
<td>Moderate</td>
<td>Observe for at least four hours Rx 1. Oral dexamethasone 2. Oxygen if SaO₂ &lt; 93% 3. Ensure adequate oral hydration 4. Discharge after four hours if fulfils the discharge criteria (see below), otherwise admit.</td>
</tr>
<tr>
<td>With Significant stridor at rest, Severe retractions, Reduced air entry + SaO₂ &lt; 93%</td>
<td>Severe</td>
<td>Nebulised adrenaline Nebulised Budesonide Inform Paediatrician Admit to HDU and if no sustained improvement notify anaesthetist as may need intubation</td>
</tr>
<tr>
<td>With Confusion, Drowsiness</td>
<td>Very Severe</td>
<td>Notify Anaesthetist, Paediatrician and ENT Surgeon Intubate IV Cannulation</td>
</tr>
</tbody>
</table>
Criteria for Discharge

- No stridor at rest
- Normal pulse oximetry
- Good air entry
- Normal colour
- Normal level of conscious
- Demonstrated ability to tolerate fluids by mouth
- Caregivers understand the indications for return to care and would be able to return if necessary.

. Monitoring compliance and effectiveness

<table>
<thead>
<tr>
<th>Element to be monitored</th>
<th>Compliance with guideline- first line drug treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>Audit Lead</td>
</tr>
<tr>
<td>Tool</td>
<td>Audit, Datix investigation</td>
</tr>
<tr>
<td>Frequency</td>
<td>At point of investigation or bi annually</td>
</tr>
<tr>
<td>Reporting arrangements</td>
<td>Audit lead, Audit and guidelines directorate meeting</td>
</tr>
<tr>
<td>Acting on recommendations and Lead(s)</td>
<td>Actions will be delegated at directorate meetings.</td>
</tr>
<tr>
<td>Change in practice and lessons to be shared</td>
<td>Required changes to practice will be identified and actioned. A lead member of the team will be identified to take each change forward where appropriate. Lessons will be shared with all the relevant stakeholders</td>
</tr>
</tbody>
</table>

. Equality and Diversity

- This document complies with the Royal Cornwall Hospitals NHS Trust service Equality and Diversity statement.

. Equality Impact Assessment

The Initial Equality Impact Assessment Screening Form is at Appendix 2.
## Appendix 1. Governance Information

<table>
<thead>
<tr>
<th>Document Title</th>
<th>Clinical Guideline for the management of viral laryngo-tracheobronchitis. (Croup)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Issued/Approved:</td>
<td>6 November 2013</td>
</tr>
<tr>
<td>Date Valid From:</td>
<td>6 November 2013</td>
</tr>
<tr>
<td>Date Valid To:</td>
<td>1 November 2016</td>
</tr>
</tbody>
</table>
| Directorate / Department responsible (author/owner):                           | Dr. Prendeville  
Child Health                                           |
| Contact details:                                                               | 01872252017                                                                       |
| Brief summary of contents                                                      | Clear guidance for medical and nursing staff caring for a child presenting with Croup. |
| Suggested Keywords:                                                           | Children  
Croup  
Respiratory                                                                 |
| Target Audience                                                               | RCHT  
PCH  
CFT  
KCCG |
| Executive Director responsible for Policy:                                     | Medical Director                                                                  |
| Date revised:                                                                 | September 2013                                                                    |
| This document replaces (exact title of previous version):                      | Guideline for the management of Viral Laryngo-tracheobronchitis (Croup)            |
| Approval route (names of committees)/consultation:                             | Paediatric Consultants  
Child Health Audit and Guidelines meeting                                               |
| Divisional Manager confirming approval processes                                |                                                                                  |
| Name and Post Title of additional signatories                                 | Not required                                                                     |
| Signature of Executive Director giving approval                                |                                                                                  |
| Publication Location (refer to Policy on Policies – Approvals and Ratification): | Internet & Intranet  
✓ Intranet Only                                                      |
| Document Library Folder/Sub Folder                                            | Paediatrics                                                                       |
| Links to key external standards                                                |                                                                                  |
Related Documents:


Training Need Identified? No

Version Control Table

<table>
<thead>
<tr>
<th>Date</th>
<th>Version No</th>
<th>Summary of Changes</th>
<th>Changes Made by (Name and Job Title)</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 2011</td>
<td>V1.0</td>
<td>Initial Issue</td>
<td>Dr. Anne. Prendeville Paediatric Consultant</td>
</tr>
<tr>
<td>November 2013</td>
<td>V2.0</td>
<td>Review of content and re format.</td>
<td>Dr. Anne. Prendeville Paediatric Consultant Tabitha Fergus Deputy ward manager</td>
</tr>
</tbody>
</table>

All or part of this document can be released under the Freedom of Information Act 2000. This document is to be retained for 10 years from the date of expiry. This document is only valid on the day of printing.

Controlled Document

This document has been created following the Royal Cornwall Hospitals NHS Trust Policy on Document Production. It should not be altered in any way without the express permission of the author or their Line Manager.
Appendix 2. Initial Equality Impact Assessment Form

Name of the strategy / policy / proposal / service function to be assessed (hereafter referred to as policy) (Provide brief description): Clinical guideline for the management of viral laryngo-tracheobronchitis (Croup)

<table>
<thead>
<tr>
<th>Directorate and service area: Child Health</th>
<th>Is this a new or existing Policy? Existing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of individual completing assessment: T. Fergus</td>
<td>Telephone: 01872252800</td>
</tr>
</tbody>
</table>

1. Policy Aim*
Who is the strategy / policy / proposal / service function aimed at?
To provide clear guidance for medical and nursing staff caring for a child with croup.

2. Policy Objectives*
Clear guidance in management, observation, treatment and discharge.

3. Policy – intended Outcomes*
Evidence based, standardised practice.

4. *How will you measure the outcome?
Audit

5. Who is intended to benefit from the policy?
Children and families. Medical and nursing staff.

6a) Is consultation required with the workforce, equality groups, local interest groups etc. around this policy? no
b) If yes, have these *groups been consulted?
C). Please list any groups who have been consulted about this procedure.

7. The Impact
Please complete the following table.
Are there concerns that the policy could have differential impact on:

<table>
<thead>
<tr>
<th>Equality Strands:</th>
<th>Yes</th>
<th>No</th>
<th>Rationale for Assessment / Existing Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

Clinical Guidelines for the Management of viral laryngo-tracheobronchitis Croup
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<table>
<thead>
<tr>
<th>Category</th>
<th>Ticked</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex (male, female, transgender / gender reassignment)</td>
<td>X</td>
</tr>
<tr>
<td>Race / Ethnic communities /groups</td>
<td>X</td>
</tr>
<tr>
<td>Disability - learning disability, physical disability, sensory impairment and mental health problems</td>
<td>X</td>
</tr>
<tr>
<td>Religion / other beliefs</td>
<td>X</td>
</tr>
<tr>
<td>Marriage and civil partnership</td>
<td>X</td>
</tr>
<tr>
<td>Pregnancy and maternity</td>
<td>X</td>
</tr>
<tr>
<td>Sexual Orientation, Bisexual, Gay, heterosexual, Lesbian</td>
<td>X</td>
</tr>
</tbody>
</table>

You will need to continue to a full Equality Impact Assessment if the following have been highlighted:

- You have ticked “Yes” in any column above and no consultation or evidence of there being consultation - this excludes any policies which have been identified as not requiring consultation. or
- Major service redesign or development

8. Please indicate if a full equality analysis is recommended. | Yes | No x |

9. If you are not recommending a Full Impact assessment please explain why.

Not required

<table>
<thead>
<tr>
<th>Signature of policy developer / lead manager / director</th>
<th>Date of completion and submission</th>
</tr>
</thead>
<tbody>
<tr>
<td>T. Fergus</td>
<td>Sep 2013</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Names and signatures of members carrying out the Screening Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
</tbody>
</table>

Keep one copy and send a copy to the Human Rights, Equality and Inclusion Lead, C/o Royal Cornwall Hospitals NHS Trust, Human Resources Department, Knowledge Spa, Truro, Cornwall, TR1 3HD

A summary of the results will be published on the Trust’s web site.

Signed T. Fergus

Date 26/09/13