**Bronchiolitis- Outpatient Phase**

**Child with respiratory distress**

**Triage:**
Include HR, Temp, WT for any sick child visit

**History and Physical**
Initial Respiratory Assessment by provider
Diagnosis of Bronchiolitis*

**Supportive Care**
- Suction
- Hydration, nutrition
- Supplemental Oxygen
- Consider pulse oximetry
- Fever management

**Mild (0)**
Consider bulb suction

**Moderate (1)**
Bulb suction
Consider pulse ox

**Severe (2)**
Consider transfer to ED

**Anticipatory Guidance:**
- Expected clinical course
- Proper suctioning
- Need to monitor fluid intake and output
- Indications to return
- Show bronchiolitis care video

**Transfer Criteria**
Decision based on:
- Duration of illness
- Need supplemental O2 by Pulse-Ox or WOB
- Signs of dehydration and unable to feed

**Not Recommended:**
- Bronchodilators
- Chest X-Ray
- Steroids
- Antibiotics
- Viral testing

*Bronchiolitis is a common, acute lower respiratory tract illness of children occurring during the first 2 years of life. Typical presentation:
- Viral URI and cough
- Work of breathing
- Tachypnea
- Wheeze
- Coarse rales
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**Consider Heart Rate along with assessment criteria**

<table>
<thead>
<tr>
<th></th>
<th>Mild (0)</th>
<th>Moderate (1)</th>
<th>Severe (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RR</td>
<td>&lt;3 Months</td>
<td>30-60</td>
<td>61-80</td>
</tr>
<tr>
<td></td>
<td>3 - &lt;12 Months</td>
<td>25-50</td>
<td>51-70</td>
</tr>
<tr>
<td></td>
<td>1Y – 2Y</td>
<td>20-40</td>
<td>41-60</td>
</tr>
<tr>
<td>WOB</td>
<td>None or Mild</td>
<td>Intercostal Retractions</td>
<td>Nasal flaring, grunting, head bobbing</td>
</tr>
<tr>
<td>Mental Status</td>
<td>Baseline</td>
<td>Fussy or anxious</td>
<td>Lethargic or inconsolable</td>
</tr>
<tr>
<td>Oxygen Requirement</td>
<td>None</td>
<td>&lt; 1.5 liters</td>
<td>&gt;1.5 liters</td>
</tr>
<tr>
<td>Suctioning</td>
<td>Bulb</td>
<td>Wall/Bulb</td>
<td>Wall</td>
</tr>
<tr>
<td>Breath Sounds</td>
<td>Clear</td>
<td>Crackles, Wheezing</td>
<td>Diminished breath sounds or significant crackles, wheezing</td>
</tr>
<tr>
<td>Cough</td>
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If used document reason and response

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Bronchiolitis - ED Phase

**Inclusion Criteria**
- Age <2 years presenting with 1st or 2nd episode of bronchiolitis
- Infants <1 month of age
- Congenital heart disease
- Chronic lung disease
- Cystic fibrosis
- 2 or more previous episodes of bronchiolitis
- Ventilator requirement
- Immune deficiency

**Exclusion Criteria**
- Routine testing for viral pathogens
- NOT recommended unless for cohorting

**Initial Assessment**
- Place in respiratory contact isolation
- Score, perform interventions, score again
- Provide supplemental O2 to keep saturation >90% (>88% asleep)
- HFNC if pt. has increased work of breathing and/or oxygen saturation not on target

**Pre-suction score is LOW (1-3)**
- Score, suction, score prior to feeding or if more distressed
- Nasal suction
- No continuous pulse oximetry
- May attempt oral feeds

**Pre-suction score is MODERATE (4-6)**
- Score, suction, score prior to feeds or if more distressed
- Nasal suction
- Spot pulse ox for nasal cannula <2LPM
- Supplemental oxygen for SpO2 ≤ 90%
- May attempt oral feeds

**Pre-suction score is HIGH (27)**
- Score, suction, score
- Nasal suction
- Continuous pulse oximetry for HFNC flow >2LPM
- Spot pulse oximetry for nasal cannula >2LPM
- Supplemental oxygen for SpO2 ≤ 90%
- IV fluid only
- May consider HFNC trial as outlined below
- May consider one time trial of inhaled bronchodilator after suctioning. If >2 point reduction in respiratory score, albuterol may be ordered prn on beta respiratory protocol

**Rescore after intervention and determine disposition**
- If score still low after interventions, consider discharge
- Discharge follow-up with PCP in 1-2 days
- If score still moderate after interventions, admit to inpatient unit
  - Suction and reevaluation
  - Respiratory score (score, suction, score) Q1 hour + prn if mild to moderate distress
  - For patients with prolonged ED stays, may space suctioning per MD discretion
- If score still high after interventions, consider admission to IMU/ICU
  - Suction and reevaluation
  - Respiratory score and suction q30 minutes + prn if severe respiratory distress
  - For patients with prolonged ED stays, may space suctioning per MD discretion

**Inpatient Admit Criteria**
- Moderate-severe distress (nasal flaring, retractions, tachypnea, or cyanosis)
- Sustained hypoxemia (SpO2<90% awake, 88% asleep)
- Dehydration/impaired oral hydration requiring ongoing IV or NG fluids
- HFNC trial initiated, clinically improved or unchanged
- Parents unable to care for child at home
- Apnea

**IMU Admit Criteria**
- Max flow for cannula size per HFNC protocol (addendum)
  - PEWS score ≥5

**PICU Admit Criteria**
- (any of the following)
  - Clinical worsening despite floor max HFNC support
  - Desaturations below 90% despite 100% FiO2
  - Other late findings of respiratory failure: -inappropriately low respiratory rate with worsening obstruction
  - Lethargy despite noxious stimuli -Poor perfusion
  - Apnea with associated bradycardia/desaturation requiring intervention

**Family Teaching**
- Viral illness, treated by hydration and suction
- Signs of respiratory distress
- How to bulb suction
- When to suction
- Frequent feeds and watch hydration status
- Cough may last 2-4 weeks, do NOT use OTC cough and cold medications
- Avoid tobacco smoke

**One time trial of inhaled bronchodilators may be considered**

**Consider HFNC for significant hypoxia OR severe respiratory distress not improving with rigorous supportive care (suction, hydration, antipyretics)**

***If pt. waiting in ED for 4 hours or more after admission/floor orders placed, implement floor orders in the ED and move to inpatient phase***
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Pre-suction score is LOW (1-3)

- RRT scores, intervention, scores prior to feeding or if more distressed, minimum of Q6 hours and PRN
- Nasal suction with bulb syringe
- No continuous pulse oximetry
- If on IV/NG fluids, discontinue fluids and restart oral feeds
- Oral feeds with observation of first feed by RN
- Initiate NG feeds after observation of poor oral feed

Pre-suction score is MODERATE (4-6)

- RRT scores, intervention, scores prior to feeds or if more distressed, minimum of Q4 hours and PRN
- Nasal suction
- Continuous pulse ox for HFNC flow >2LPM
- Spot pulse ox for nasal cannula <2LPM
- Supplemental oxygen for SpO2 ≤ 90%
- Oral feeds with observation by RN or Speech Therapy

Pre-suction score is HIGH (≥7)

- RRT scores, intervention, scores minimum of Q2 hours and PRN
- Nasal suction
- Continuous pulse oximetry for HNC flow >2LPM
- Spot pulse oximetry for nasal cannula <2LPM
- Supplemental oxygen for SpO2 ≤ 90%
- NG/IV fluids only
- May consider HFNC trial as outlined in escalation box below

Rescore at interval specified above (either 2, 4, or 6 hours) and re-categorize based on pre-suction score

Discharge Criteria

Patients should meet ALL of the following criteria:

- Respiratory score < 3 for at least 8 hours
- Off supplemental O2 for 6 hours
- If apnea occurred, no further apnea for 48 hours
- Caretaker knows how to clear infant’s airway using bulb suction
- Feeding adequately

Family Teaching

- Signs of respiratory distress
- How and when to nasally suction
- Maintaining hydration
- Anticipatory guidance
- Provide bronchiolitis video for parent to watch
- Document caregiver return demonstration of bulb suctioning

Escalation for worsening patients

- Transfer to PICU if pt. has continued respiratory distress despite maximum flow for HFNC device
- Consider HFNC for significant hypoxia OR severe respiratory distress not improving with rigorous supportive care (suction, hydration, antipyretics)
**Bronchiolitis Pathway Medication Dosing**

Medication dosing for one-time trial:

Nebulization solution pre-diluted 2.5mg in 3ml NS (0.83%)

Aerosol inhaler (HFA): 90mcg/actuation 4 actuations/dose

Possible side effects include tachycardia, palpitations, tremor, insomnia, nervousness, nausea, and headache.

Use of tube spacers or chambers may enhance efficacy of metered dose inhalers and have been proven to be just as effective and sometimes safer than nebulizers.
<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
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<tbody>
<tr>
<td><strong>Respiratory Rate</strong></td>
<td>≤40</td>
<td>41-60</td>
<td>61-80</td>
<td>&gt;80</td>
</tr>
<tr>
<td><strong>Retractions</strong></td>
<td>None</td>
<td>Intercostal only</td>
<td>Intercostal + subcostal</td>
<td>Suprasternal or chest/abdomen asynchrony</td>
</tr>
<tr>
<td><strong>Wheezing/crackles</strong></td>
<td>None</td>
<td>Expiratory</td>
<td></td>
<td>I/E or diminished aeration</td>
</tr>
</tbody>
</table>
Clinical Definitions

Bronchiolitis is an acute infectious inflammation of the bronchioles resulting in obstructive airway disease.

- Age <2 years (peak 3-6 months)
- Prodromal viral upper respiratory symptoms
- Lower respiratory symptoms follow
  - Small airway edema and epithelial cell sloughing
  - Mucous production
  - Bronchospasm
  - Hyperinflation
**Goals**

To develop an evidence-based pathway for care of infants with bronchiolitis that standardizes care at Arkansas Children's and limits unnecessary testing and therapies.

**Outcome Measures:**

1. Patient safety: To reduce the number of bronchiolitis related emergent escalations of care to zero by July 1, 2019.
2. Patient experience: To reduce 7 day readmissions from 1.65% to < 1.5% for the same diagnosis by July 1, 2019 (Solutions for Patient Safety data).

**Process Measures:**

1. To increase bronchiolitis pathway adherence by 25% by July 1, 2019.
2. To decrease the number of patients treated with ineffective/inappropriate bronchodilator therapy from 54% to <50% by July 1, 2019 (PHIS data).
3. To increase the number of patients placed on the Heated Nasal Cannula (HNC)/High Flow Nasal Cannula (HFNC) pathway who are also on the bronchiolitis pathway from 70% to 90% by July 1, 2019.

**Metrics**

1. Readmission within 7 days for same diagnosis
2. Bronchodilator utilization
3. Number of emergent escalations of care
4. Length of stay comparable to benchmark

Quality Improvement Department will track data for compliance/improvement purposes.
References

Contributing Members

Inpatient Pathway

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