

Bronchiolitis Clinical Pathway

October 2021

Outcomes/Goals	<ol style="list-style-type: none"> 1. Provide an evidence-based approach to the diagnosis and management of bronchiolitis 2. Create a team-oriented approach to efficient evaluation including use of PBST scoring 3. Reduce routine use of unnecessary diagnostics and treatments
Inclusion Criteria	<p>≤ 2 years of age</p> <p>Viral respiratory symptoms including rhinorrhea, fever, cough, wheezing, and difficulty feeding</p>
Exclusion Criteria	Cardiac disease, chronic lung disease and/or home oxygen, anatomic airway abnormalities, immunodeficiency, apnea, born < 32 weeks gestation, neuromuscular disease
NURSE Triage documentation	Chief complaint. Onset of symptoms. Risk factors. Hydration and nutrition status. Vital signs. PBST score. Work of breathing. Quality of breath sounds. Frequency of nasal suctioning.
INTERVENTIONS Initiate on arrival	<p>ESI Triage level I, II or III</p> <p>Initiate Eye protection and Droplet and contact isolation</p> <p>Full set of vitals</p> <p>Document hydration, Pediatric Bronchiolitis Score (PBST) and work of breathing</p> <p>Evaluate need for positioning and nasal suctioning</p> <p>Continuous pulse oximetry if initial SaO₂ < 92%. Re-evaluate the need for continuous monitoring and adjust as condition warrants</p> <p>Low flow Oxygen to maintain SaO₂ ≥ 92%</p> <p>Document and complete elements of HFNC Initiation Pause (HIP) prior to initiation of HFNC</p> <p>LMX to extremity for IV start if moderate to severe dehydration or RR >60 or severe on PBST</p> <div style="border: 2px solid red; padding: 5px;"> <ul style="list-style-type: none"> Attempt suctioning with manual device If unable to clear nasal secretions or wall suctioning required observe minimally through at least one feeding and one rest/sleep period prior to discharge < 2 months of age - High Risk of Apnea – consider admission/transfer/prolonged observation period prior to discharge </div>
DIAGNOSTICS	<p>Virology tests recommended only if results will change treatment or for inpatient cohorting</p> <p>Consider chest radiograph if patient requires admission</p>
PHYSICIAN (LIP)	
Medication Albuterol	Consider a one-time trial of albuterol within the first 12 hours of presentation. Continue only if documented positive clinical response (decreased RR / WOB). All trials should have RN/MD huddle before and after with agreed PBST scoring to determine clinical response to treatment.
Corticosteroids	Prelone or Dexamethasone NOT recommended for routine management
Fluids (if indicated)	Encourage oral rehydration prior to IV rehydration If unable to tolerate Oral Rehydration Therapy (ORT), then Normal Saline bolus 20 ml/kg
High-flow nasal cannula	Start at 1 L/kg/min, can increase up to the max of the cannula for moderate to severe bronchiolitis
ADMISSION	<p>Call primary care physician</p> <p>Call Pediatric Hospital for transfer</p> <p>Prepare family/infant for admission to PICU, ward or ED to ED transfer</p> <p>Infants at high risk of illness progression:</p> <ul style="list-style-type: none"> Gestational age <35 weeks Congenital heart disease and/or Chronic lung disease Age < 3 months
Discharge teaching	Typical features of the clinical syndrome of bronchiolitis are profuse rhinorrhea, rapid respirations, retractions, cough, and wheeze. The typical age is under 2 years. Mainstay of therapy is supportive care with an emphasis on suctioning, positioning, and hydration (including pacing of feeds) . Additional discharge information should focus on prevention and hand washing (including an alcohol-based rub) for all family members.

Clinical Pathway Decision Making Process:

Bronchiolitis

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****Former Premature infants may be included but expect a longer and/or more severe course. They are at higher risk for apnea and should be considered for admission or longer observation periods***

SCORING: All patient assessments should use the ***Pediatric Bronchiolitis Scoring Tool (PBST)***. Patient should be suctioned and repositioned if needed **prior** to scoring. Document PBST score in appropriate flowsheet rows.

OVERALL CARE GOALS

- In general, best practice is fewer interventions in bronchiolitis. Care is primarily supportive and should focus on frequent suction (nasal or NP suction), adequate hydration/nutrition (enterally preferred), and supplemental oxygen if hypoxemic (<90% awake, <88% asleep for period >20 seconds).
- Please see appropriate high flow or feeding guidelines for explicit guidance.

	0 points	1 point	2 points	3 points
Respiratory Rate				
<3 months	30-60	61-69	≥70 or below normal for age	
3-12 months	25-50	51-59	≥60 or below normal for age	
12-24 months	20-40	41-44	≥45 or below normal for age	
Accessory Muscle Use	None	1 point each for: - Flaring - Intercostal retractions - Substernal retractions - Head bobbing		
Breath Sounds	Normal breathing, no wheezing	End expiratory wheeze only	Expiratory wheezing throughout	Inspiratory and expiratory wheeze OR diminished sounds OR both
Alertness	"Age Appropriate" Normal feeding, vocalizations, activity	Agitated	Doesn't arouse appropriately	Confused or somnolent
Dyspnea	None	SOB with activity	SOB with talking or feeding	SOB at rest

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Discouraged Therapies

- Racemic Epinephrine
- Corticosteroids (inhaled or systemic)
- Antibiotics
- Montelukast
- Chest physiotherapy

TRIAGE: ESI I, II, or III.

Chief complaint. Onset of symptoms. Risk factors. Hydration and nutrition status. Vital signs. PBST score. Work of breathing. Quality of breath sounds. Need/frequency for nasal suctioning. Isolation.

Signs of Clinical Deterioration

- Lethargy
- Very high or low respiratory rate
- Poor perfusion
- Worsening hypoxia

1. Assess, suction patient
2. Reposition/suction if needed
3. Calculate severity using Pediatric Bronchiolitis Scoring Tool

PBST Score ≤3 (Mild)

- Q4H assessments prn
- Nasal suction
- Attempt bulb suction first
- No continuous monitoring (unless concern for apnea or on O2)
- PO trial
- Consider discharge

PBST Score 4-7 (Moderate)

- At least Q2hr assessments
- Nasal suction; use wall suction if clinically indicated
- Consider PO vs NG feeds per feeding algorithm
- Consider admission vs observation
- If considering HFNC, perform a HIP

PBST Score 8-14 (Severe)

- Q1-2 assessments
- Nasal Suction
- Continuous pulse oximetry
- IV fluid bolus
- Consider Chest X-ray

HFNC Initiation Pause (HIP)

1. Nasal suctioning
 2. Attempt feed if safe for PO (vs. sucrose on pacifier)
 3. Encourage parent to hold patient, dim lights
 4. Administer antipyretic for comfort
 5. Address hydration needs, consider bolus prn
 6. Consider low flow nasal cannula (for sat <92% and/or increased WOB)
- **RN/LIP huddle after 20-30 minutes to reassess**

HIP FAIL

NO

Stabilized or Improved?
RN to document HIP outcome

YES

HIP PASS

- Remain on RA/low flow NC
- Continue Routine Care
- Reassess* per PBST protocol

Escalation of Care

1. **High flow nasal cannula**—Start at 1 L/kg/min. May increase to max of cannula. Complete HFNC initiation huddle, document .HIGHFLOWPEDIATRICHUDDLE
2. **Albuterol Trial x 1**—could be considered if **HIGH risk history or severe respiratory distress.**

- *Re-huddle 2 hours after HFNC initiation and assess for clinical improvement
- Admit to Ped Ward vs PICU. If HFNC ≥ 2 L/kg/min, must admit to PICU

Assessment Frequency

*After two consecutive assessments in the lower range, a patient may change to a lower/less severe disease classification (e.g. after two scores of 5 spaced two hours apart, change from Severe → Moderate classification)

*A single higher score will immediately increase severity level

DIAGNOSIS	ASSESSMENTS	INTERVENTIONS
<ul style="list-style-type: none"> • Diagnosis is usually made by clinical presentation, history, and seasonality. Acute bronchiolitis should be considered in infants with nasal discharge, wheezing, inspiratory crackles and/or high-pitched expiratory wheeze. Apnea may be presenting complaint especially <3 months of age. • Chest x-rays are not routinely encouraged, though consider if severely ill. Virology tests (RSV swab/culture) recommended only if results will change treatment decision or for inpatient cohorting. • Increased respiratory rate should arouse suspicion of lower respiratory tract infections like bronchiolitis or pneumonia. • High fever (>39°C) warrants careful evaluation for other causes. Absence of fever should not preclude diagnosis of acute bronchiolitis. 	<p>Continuous pulse oximetry is NOT necessary for all patients.</p> <p style="text-align: center;">SaO2 <90%</p> <p>Usually require inpatient hospitalization. If oxygen is required to maintain adequate oxygenation they should not be admitted to ED Obs.</p> <p style="text-align: center;">SaO2 90-94%</p> <p>Require supportive care, ongoing assessments including hydration/nutrition status, phase of illness, suctioning requirements, social and geographical factors. May require observation period. Must be able to maintain SaO2 levels and tolerate PO intake prior to discharge. Neonates (<3 months) require longer observation periods due to higher risks for apnea and are not ED obs appropriate.</p> <p style="text-align: center;">SaO2>94%</p> <p>Supportive care, able to maintain oral intake, PBST score <3 (mild) x 2; consider for discharge.</p>	<ul style="list-style-type: none"> • Vital signs including room air SaO2. • Use the Pediatric Bronchiolitis Scoring Tool (PBST). • If <3 months of age suction first with bulb syringe. If unable to adequately clear secretions suction with nasal aspirator. • Initiate isolation (droplet). • Perform HIP interventions prior to starting HFNC for PBST 1-7 • Consider a one-time trial of albuterol (within the first 12 hours of presentation). Continue only if documented positive clinical response. Trial should be RN and MD at bedside to evaluate before and after. • Prelone or Dexamethasone <u>not</u> recommended for routine management.
RISK FACTORS	INTENSIVE CARE CONSULTATION	SUPPORTIVE CARE / DISCHARGE CRITERIA
<ul style="list-style-type: none"> • <3 months of age • Infants born <35 weeks gestation • Congenital heart disease • Chronic lung disease • Exposure to second-hand smoke 	<p>Consider PICU consult for:</p> <ul style="list-style-type: none"> • Failure to maintain oxygen saturations >90% with increasing oxygen therapy • Deteriorating respiratory status with signs of increasing distress or exhaustion • Recurrent apnea • PBST score 8-14 (Severe) 	<ul style="list-style-type: none"> • SaO2 >92% • If supplemental oxygen required, monitor for 8-12 hours after oxygen discontinued including a period of sleep • If unable to maintain oral intake/hydration support with IV therapy or NG feeds • Infants <3 months must be able to clear nasal secretions with bulb syringe (not aspirator) and feed without desaturation prior to discharge • Infants with oxygen saturation levels <92%, have severe respiratory distress or cyanosis should receive supplemental oxygen

Bronchiolitis Rationale and Data

Goals of Clinical Pathway

1. Provide an evidence-based approach to the diagnosis and management of bronchiolitis
2. Create a team-oriented approach to efficient evaluation including use of PBST scoring
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Diagnosis and Management of Bronchiolitis

Bronchiolitis is a disorder most commonly caused in infants by viral lower respiratory tract infection. It is the most common lower respiratory infection between the ages of 12 weeks and 2 years.

Bronchiolitis is characterized by acute inflammation, edema of the airway, increased mucus production and bronchospasm. Clinical signs and symptoms include rhinitis, tachypnea, wheezing, cough, crackles, and use of accessory muscles and/or nasal flaring.

90% of children are infected with RSV in the first 2 years of life. Infection does not grant permanent or long-term immunity.

AAP Recommendations for Treatment and Diagnosis of Bronchiolitis

Bronchiolitis is a clinical diagnosis that does not require advanced diagnostic testing. The AAP offers the following recommendations in the diagnosis and treatment of bronchiolitis relevant to emergency care.

1. Bronchiolitis should be diagnosed on the basis of history and physical examination. Clinicians should not routinely order laboratory and radiologic studies for diagnosis.
2. Assess risk factors, which include ages less than 12 weeks, history of prematurity, underlying cardiopulmonary disease or immunodeficiency when making decisions about evaluation and management.
3. Bronchodilators should not be used routinely in the management of bronchiolitis. A one-time trial within 12 hours of presentation is an option. Continue only if documented positive clinical response.
4. Corticosteroid medications should not be used routinely in the management of bronchiolitis.
5. Clinicians should assess hydration and ability to take fluids orally.
6. Chest physiotherapy should not be used routinely in management of the disease.
7. Supplemental oxygen is indicated if saturation levels fall persistently below 90% (previously healthy infants).
8. Continuous measurement of saturation levels is not routinely needed.
9. Hand decontamination is the most important step in preventing nosocomial spread of RSV. Alcohol-based rubs are preferred for hand decontamination. Clinicians should educate personnel and family members on hand sanitation.
10. Infants should not be exposed to passive smoking.

References:

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4. Gadomski AM, Scribani MB. Bronchodilators for bronchiolitis. *Cochrane Database Syst Rev* 2014; :CD001266.
5. Kepreotes E, Whitehead B, Attia J, et al. High-flow warm humidified oxygen versus standard low-flow nasal cannula oxygen for moderate bronchiolitis: an open, phase 4, randomized controlled trial. *Lancet*. 2017 Mar 4;389(10072):930-939.
6. Franklin D, Babl FE, Schlappach LJ, et al. A Randomized Trial of High-Flow Oxygen Therapy in Infants with Bronchiolitis. *N Engl J Med*. 2018 Mar 22;378(12):1121-1131.