

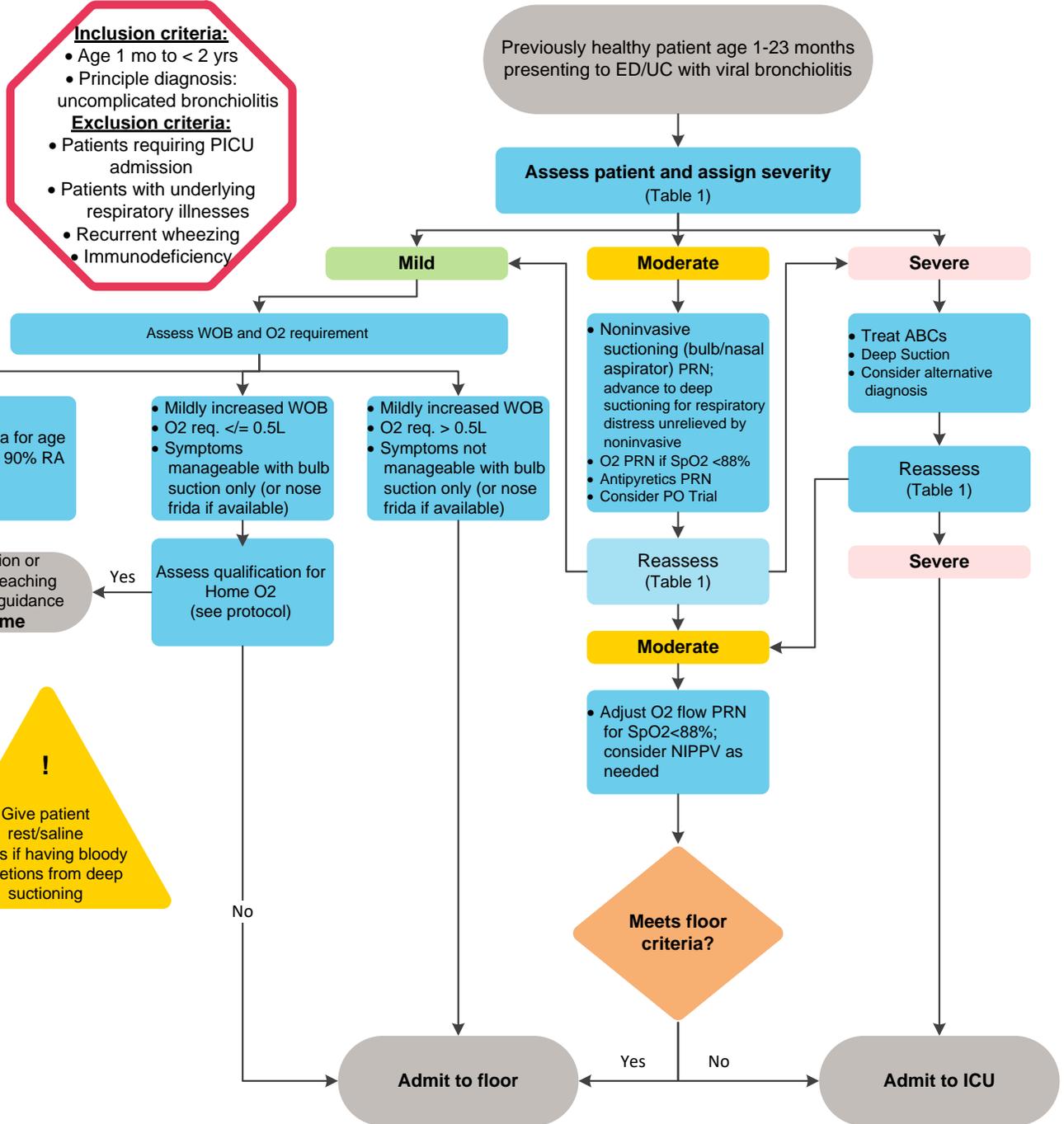
# PEDIATRIC VIRAL BRONCHIOLITIS

## ALGORITHM: Emergency Department Bronchiolitis Management

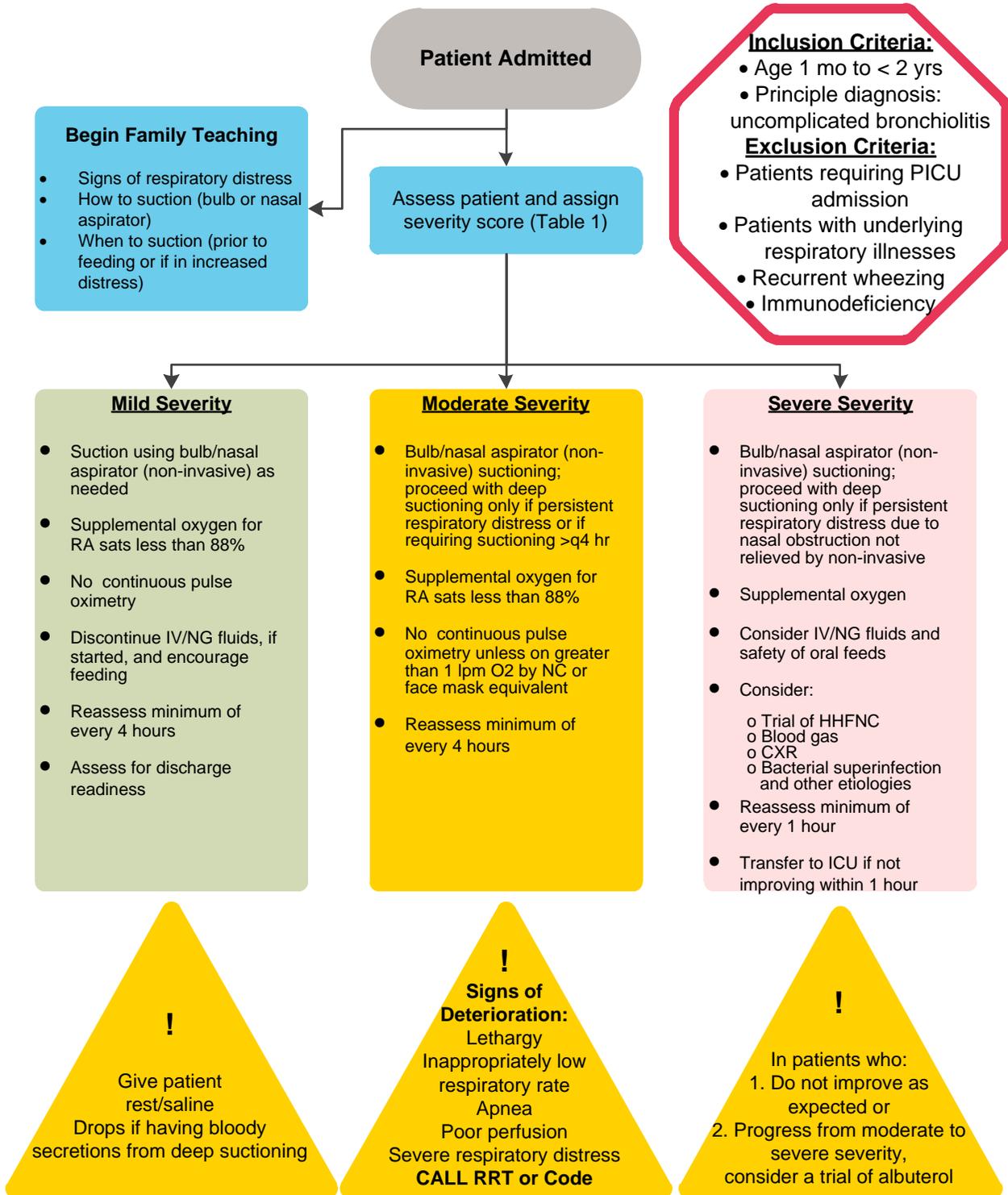
**Triage/Bedside RN:** Vital signs, pulse oximetry, blood pressure, weight.

Suction as needed beginning with bulb or nasal aspirator, advancing to deep/mechanical suction as needed for persistent respiratory distress.

**Provider:** History and physical exam, evaluate for red flags and comorbidities



**ALGORITHM: Inpatient Bronchiolitis Management**



**Clinical Titration of Oxygen for Stable Infants over 3 Months of Age**

1. If bronchiolitis symptoms are MILD, wean oxygen flow in increments of 0.125 to 0.5 Lpm. Assess for titration of oxygen at least every 4 hours.
2. If bronchiolitis symptoms are MODERATE or SEVERE, increase oxygen incrementally. Consider continuous pulse oximetry if oxygen flow is greater than 1 Lpm for infants 3 to 6 months of age or greater than 2 Lpm for children greater than 6 months of age, in consultation with medical staff.

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## TARGET POPULATION

### Inclusion Criteria

- Principle diagnosis: uncomplicated bronchiolitis (acute respiratory illness associated with nasal congestion, cough and diffuse wheezing, crackles, tachypnea, and /or retractions)
- Age: 1 month to less than 2 years
- Time: year-round

### Exclusion Criteria

- Severe bronchiolitis requiring PICU admission or deteriorating patients requiring RRT evaluation for possible PICU transfer
- Children with underlying respiratory illnesses [including cystic fibrosis (CF), bronchopulmonary dysplasia (BPD), neuromuscular disease, chronic cough, asthma, and recurrent wheezing]
- Immunodeficiency (including HIV infection, solid organ transplant, and hematopoietic stem cell transplants)
- Children with a hemodynamically significant congenital heart disease
- Serious bacterial infections (SBI), toxic appearance

## CLINICAL MANAGEMENT

### Prevention <sup>1</sup>

- Droplet precautions for all care settings
- Compliance with hand hygiene recommendations in all settings
- Protect high-risk patients from exposure
- Eliminate child's exposure to smoke
- Preventive medical therapies (RSV-IVIG or Palivizumab) may be considered for high-risk patients.<sup>1</sup> See [Palivizumab guideline](#).

### Telephone Triage

- **Activate EMS (911):** Severe difficulty breathing (struggling for breath, grunting noises with each breath, unable to speak or cry because of difficulty breathing). Blue lips. Child passed out.
- **ED/UC, or primary care office visit immediately:** Underlying heart or pulmonary disease, breathing heard across room, poor fluid intake, fever above 105°F, or age less than 3 months
  - Age less than 1 year: respiratory rate (RR) above 60, unable to drink or sleep
  - Age greater than 1 year : RR persistently above 40, difficulty breathing, not interactive
- **Phone contact with PCP:** Chronic or underlying illness, parental request
- **Office visit, see within 24 hours:** Worsening cough, rhinorrhea, and/or low-grade fever

### Emergency Department | Urgent Care ([ED Algorithm](#))

#### Consider alternative diagnosis if:

- Persistent tachycardia
- Hepatomegaly
- Heart Murmur
- Poor perfusion
- History of apnea
- Severe dehydration
- Fever in child less than 60 days
- Severe atopy

#### Admission Criteria:

- O2 requirement greater than 0.5L
- Poor feeding
- Tachypnea for age
- Ill appearance
- Witnessed apnea

### ICU Admission Criteria

- Anschutz- Respiratory failure requiring intubation, non-invasive positive pressure ventilation, or heated high flow nasal cannula exceeding approved limits for non-ICU usage
- Recurrent apnea

### CLINICAL ASSESSMENT

- Clinicians should diagnose bronchiolitis and assess severity by history and physical exam. Use [Table 1](#) to classify severity. Patients should be classified as mild, moderate, or severe for each of the 5 categories including: respiratory rate, work of breathing, breath sounds, feeding/hydration, general appearance/mental status. A patient’s overall severity is defined by the most severe classification across all 5 categories.
  - Avoid radiographic studies
  - Avoid laboratory studies
- Risk factors for severe disease:
  - Age less than 12 weeks
  - History of prematurity
- Evaluate hydration status

**Table 1. Bronchiolitis Severity Classification**

	Mild	Moderate	Severe
<b>RR</b> 0-6 months 6-12 months 13-24 months	Less than 60 Less than 50 Less than 40	61-70 51-60 41-50	Greater than 70 Greater than 60 Greater than 50
<b>Work of Breathing<sup>a</sup></b>	None to mild retractions ( <i>1 area</i> )	Moderate retractions ( <i>more than 2 areas, not severe</i> )	Severe retractions, paradoxical breathing, grunting, head-bobbing
<b>Breath Sounds/Air Exchange</b>	Minimal wheeze/rales, Good aeration	Decreased or moderate aeration	Diminished breath sounds with severely impaired aeration
<b>Feeding/Hydration Status (per caregiver report)</b>	Normal	Minimal difficulty feeding OR mildly decreased urine output	Moderate to severe difficulty feeding OR significantly decreased urine output
<b>General Appearance/Mental Status</b>	Well to mildly ill, Playing but less active than usual	Moderately ill, Alert but tired appearing, Pale, Fussy but consolable	Severely ill, toxic, cyanotic, inconsolable, lethargic, poor perfusion (cap refill more than 2 sec), or altered mental status

<sup>a</sup>Areas of Retractions: suprasternal, subcostal, intercostal, Nasal Flaring

## MONITORING FOR INPATIENT CARE

### Clinical Severity Reassessment Schedule

- Mild = at least every 4 hour assessments, consider [discharge](#)
- Moderate = at least every 2 hour assessments
- Severe = at least every 1 hour assessments

### Electronic monitoring

- Check pulse oximetry with vital signs or with a change in clinical condition
- Reserve consideration of continuous pulse oximetry for the following conditions:
  - Infants under 3 months of age
  - Infants 3-6 months of age and on greater than 1 LPM of oxygen
  - Children greater than 6 months of age and on greater than 2 LPM of oxygen
  - Unstable patients (Severe Disease Classification)
  - Patients that have a history of apnea
- Goal saturations should be:
  - At or above 90% for all patients on supplemental oxygen
  - At or above 88% for stable patients older than 3 months of age and on room air

## LABORATORY STUDIES | IMAGING<sup>2</sup>

The following diagnostic tests are NOT routinely indicated. Use **only if** they will potentially change care management.

- If concerned about influenza, consider influenza virus PCR (Flu A&B testing only)
- CBC, blood or urine cultures
- Blood gas
- Chest X-ray<sup>3</sup>

## THERAPEUTICS

### **Evaluating Clinical Status & Response to Treatment**

1. On initial assessment, determine severity classification
2. Decide on intervention based on care algorithm ([Inpatient Algorithm](#))
3. Repeat severity classification to determine if intervention was helpful

**Be objective – Don't be confused by upper-airway noise!**

### Routinely Indicated:

#### Supportive Care

- Supplemental oxygen:
  - To minimize increased work of breathing
  - If room air SpO<sub>2</sub> is less than 88%, oxygen to achieve SpO<sub>2</sub> at or above 90%<sup>1</sup>
  - Titrated per table below
- Fluids: PO / NG / IV as needed<sup>1</sup>

- Suction upper airway (use saline PRN) beginning with bulb or nasal aspirator (non-invasive suctioning):
  - Consider scheduled bulb or nasal aspirator suctioning greater than or equal to q4 hours for the first 24 hours of admission and as needed thereafter. Proceed with deep suctioning only if persistent respiratory distress due to nasal obstruction not relieved by bulb or nasal aspirator suctioning.
    - Consider withholding suctioning if evidence of nasal trauma (e.g., bleeding) or if unnecessary based on your clinical judgment.
  - Prior to feeding if upper airway obstruction is interfering with feeding
  - For evidence of upper airway obstruction causing respiratory distress

### Clinical Titration of Oxygen for Stable Infants over 3 Months of Age

1. If bronchiolitis symptoms are MILD, wean oxygen flow in increments of 0.125 to 0.5 Lpm. Assess for titration of oxygen at least every 4 hours.
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### Not routinely indicated:<sup>1</sup>

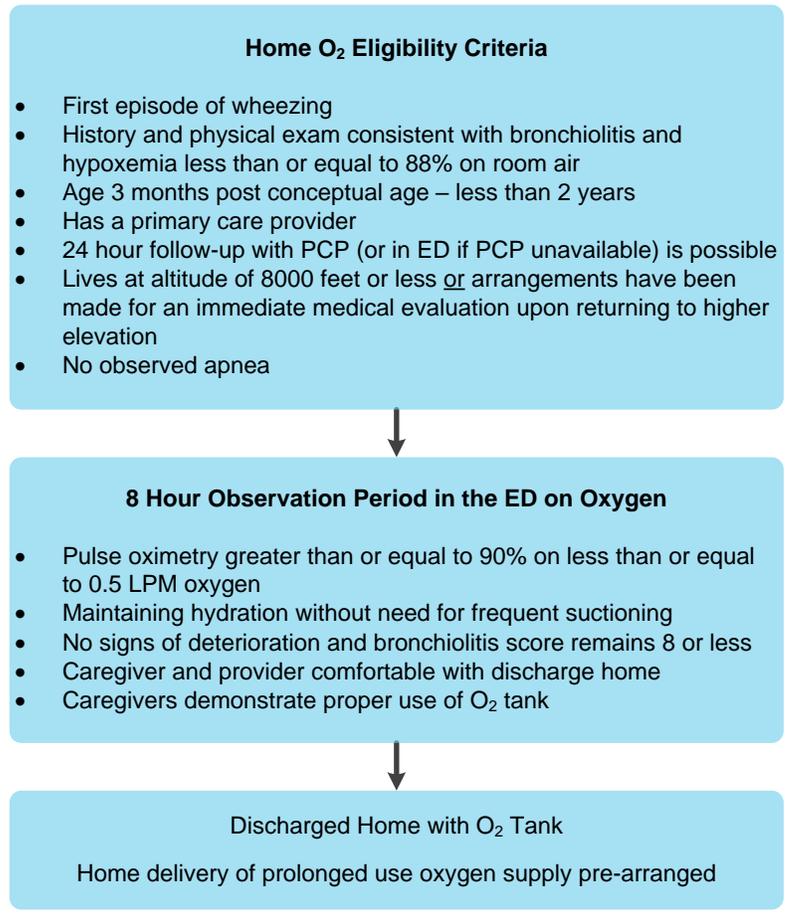
- Antibiotics unless evidence of secondary bacterial infection / sepsis
- Albuterol or inhaled racemic epinephrine<sup>1</sup>
- Inhaled or systemic steroid therapy<sup>1,5</sup>
- Positive pressure therapy (EZPAP)
- Chest physiotherapy (CPT)<sup>1,5,7</sup>

## DISCHARGE CRITERIA

(Begin Discharge Planning on Admission)

- SpO<sub>2</sub> at or above 88% on room air OR
- May consider discharge on oxygen if SpO<sub>2</sub> is at least 90% on no more than 0.5 Lpm after 8 hours of observation including sleeping and feeding ([Inpatient Algorithm](#)).
- Parent/caregivers able to clear patient's airway using home suction device
- Patient maintaining hydration orally.
- Parents/caregivers are proficient with post discharge care
- Home resources are adequate to support the use of any necessary home therapies
- Parents/Caregivers aware of smoke exposure hazards and provided with information/resources to quit smoking

**Algorithm: Home Oxygen from the Emergency Department (ED) in Patients with Bronchiolitis (after 8 Hours of Observation)**



If the initial guidelines are met, the eligible patient is observed for approximately eight hours on O<sub>2</sub> in the ED. Patients who remain stable on less than or equal to 0.5LPM O<sub>2</sub> may be discharged home on O<sub>2</sub>.

**FOLLOW-UP**

- PCP notified of discharge plan
- PCP follow-up within 24 hours when possible
- Home care agencies notified and arrangements made when necessary (i.e. home oxygen)

**PATIENT | CAREGIVER EDUCATION**

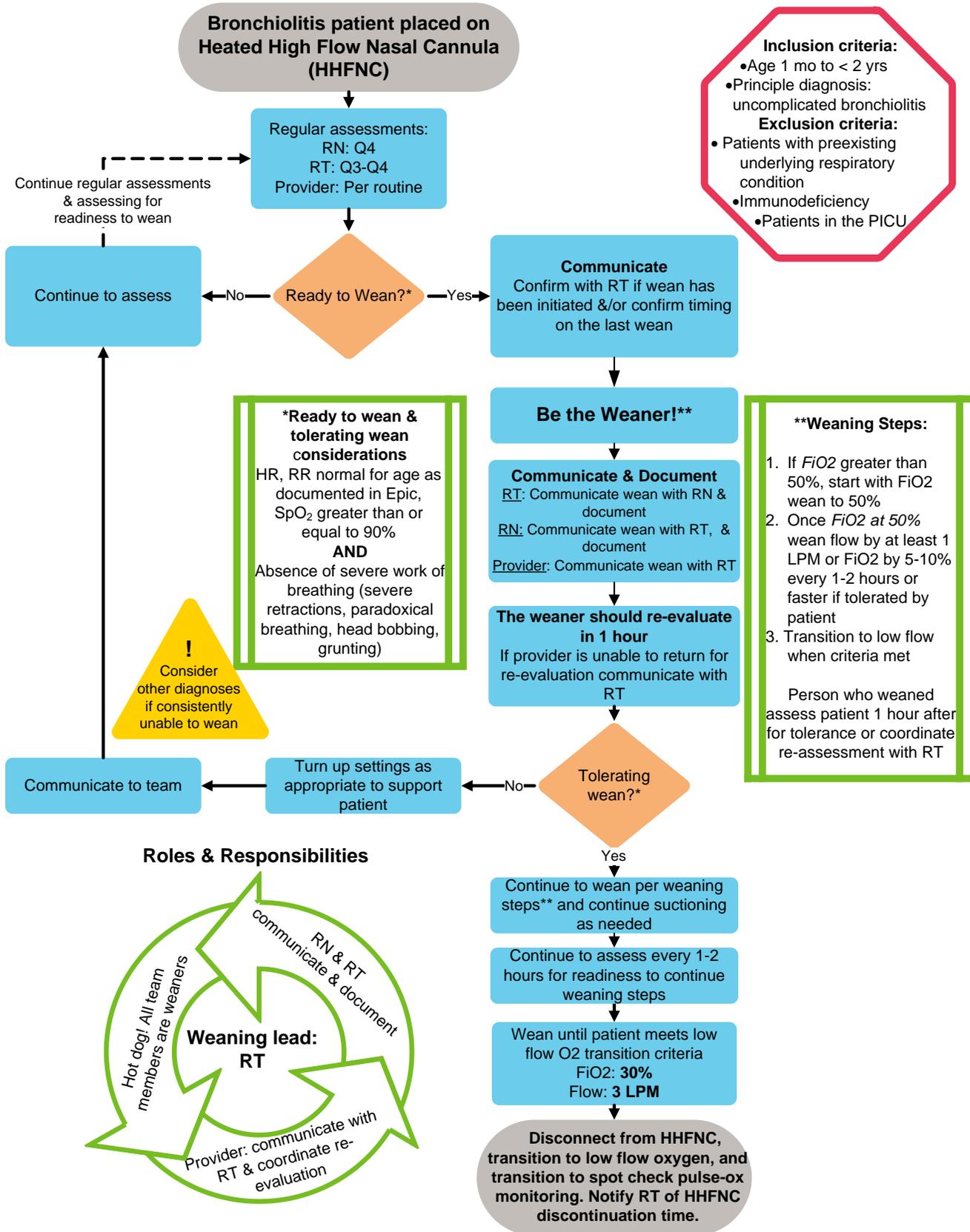
- Expected clinical course of bronchiolitis and treatment
- Proper techniques for suctioning and airway maintenance
- Signs of worsening clinical status and when to call their PCP
- Proper hand hygiene<sup>1</sup>
- Smoking Cessation Counseling<sup>1</sup>:
  - Determine patient’s exposure to smoke: when, where, who?
  - Explain the hazard of smoke exposure and its relationship to current illness

- Emphasize minimizing future exposure to smoke
- Refer family members to smoking cessation resources as appropriate:
  - Quit line: 1 (800) 630-QUIT
  - Quitnet: [www.co.quitnet.org](http://www.co.quitnet.org)
  - Provide parent/caregiver with [Education Materials](#)

### Links to Patient | Caregiver Education

- [Bronchiolitis \(English\)](#)
- [Bronchiolitis \(Spanish\)](#)
- [RSV \(English\)](#)
- [RSV \(Spanish\)](#)
- [Tobacco Smoke \(English\)](#)
- [Tobacco Smoke \(Spanish\)](#)
- [Home Oxygen Therapy \(English\)](#)
- [Home Oxygen Therapy \(Spanish\)](#)

APPENDIX A: HEATED HIGH FLOW NASAL CANNULA WEANING ALGORITHM



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**APPROVED BY**

Clinical Care Guideline and Measures Review Committee – December 13, 2016  
 Pharmacy & Therapeutics Committee – December 1, 2016

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**REVIEW REVISION SCHEDULE**

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