Inpatient Bronchiolitis Management

Clinical Practice Guideline (CPG)

SSMHealth CardinalGlennon Children's Hospital

cardinalglennon.com

Inpatient Bronchiolitis Management: Initial Treatment

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Patient admitted

- Assess patient
- **Calculate respiratory severity score (RSS)**
- Score, suction, score

Inclusion Criteria
- Age 30 days to 23 months
- Viral upper respiratory symptoms and lower respiratory symptoms that may include: increased work of breathing, cough, feeding difficulty, tachypnea, wheeze and fever

Exclusion Criteria
- History of preterm birth (<32 weeks gestational age)
- Cardiac disease requiring baseline mediation
- Chronic lung disease on home oxygen and/or diuretics
- Significant neuromuscular disease
- Any home supplemental oxygen requirement or airway clearance support at baseline
- Tracheostomy

Stop and Review

Therapies NOT Routinely Recommended
- Albuterol
- Hypotonic saline
- Chest physiotherapy
- Racemic epinephrine
- Corticosteroids
- Montelukast
- Antiobiotics
- Chest X-rays
- Viral testing
- Head of bed elevation

Stop and Review

RSS§ is LOW (1-4)
- Score minimum q4 hours
- Suction minimum q 4 hours
- Prior to feeds or if distress
- score after suctioning
- VS q8 hours
- Nasal suction*
- Spot SpO2 checks; continuous pulse oximetry if on supplemental oxygen

RSS§ is MODERATE (5-8)
- Score minimum q 4 hours
- Suction minimum q 4 hours
- VS q8 hours
- Nasal suction*
- Nasopharyngeal suction* if clinically indicated for work of breathing after nasal suctioning
- Spot SpO2 checks; continuous pulse oximetry if on supplemental oxygen

RSS§ is HIGH (9-12)
- Score minimum q1 hours
- Suction minimum q2 hours
- VS q4 hours
- Nasal suction*
- Nasopharyngeal suction* if clinically indicated for work of breathing after nasal suctioning
- Continuous pulse oximetry
- Consider HFNC trial (see escalation below)

Resource at interval sepcified above
Recategorize based on RSS

Discharge criteria

Patients meets ALL of the following criteria
- Respiratory score <= 4 for at least 8 hours
- No need for nasopharyngeal suctioning for 4 hours
- Not requiring respiratory support or supplemental oxygen for >6 hours
- Feeding adequately
- Family education has been completed
- Family understands follow up plan and has pediatrician identified

Ready for discharge

Escalation for Worsening Patients
- May consider ONE-TIME albuterol trial (only if not previously trialed) if severe or worsening respiratory distress plus increased risk for asthma
- Continue albuterol PRN ONLY if improved work of breathing; otherwise discontinue
- Consider HFNC if not improving with rigorous supportive care (suction, hydration, antipyretics)

SSMHealth Cardinal Glennon Access Center Transfer Line
888-229-2424

Owner - *PICU: Dr. Lowrie, Dr. Madson: Hospitalist: Dr. Hoefert, Dr. Hanna, Dr. Ellis, Allison Palisch NP: Residents: Drs Balusu, Richey and George: Nursing JackieRoyse: RT: Lisa Stevens, Jan Hawkins*
Approved by CGCH MEC CPG *10/28/2021*

§ - RSS = Respiratory Severity Score. RSS table is on page 5. Click here to go to page 5

§ - RSS is NOT the same as score as asthma score (CAS)

*Nasal Suction - Small Yankauer

*Nasopharyngeal suction - Long suction tube through nose deep into pharynx

Inpatient Bronchiolitis Management: High-Flow Initiation and Management

Start

Pre-HFNC Care

- Suctioning, at least three rounds
- Consider giving fluid bolus
- Antipyretic admisstered if febrile
- If RSS§= or >9 following above interventions, proceed with initiation of HFNC

Initiate HFNC at 1L/kg/min, FiO2=21%

- Titrate FiO2 to maintain SpO2 = or > 90%; Max. floor FiO2=50%

Huddle at least 60 minutes after HFNC intiation

Clinically Unchanged/Worsening

- Can increase upto 2L/kg/min of flow and repeat huddle 60 minutes post-increase
- If requireing escalation up to 2L/kg/min of flow, make NPO until clinical improvement
- Consider rapid rsponse and PICU assessment
- Suction and vitals q30 minutes until improvement or transfer

Clinically Improving

- Suction at least Q2 hours until off HFNC
- Vitals q4 hours until off HFNC
- Assess q4 hours for readiness to wean

Feeding

- Post-initiation of HFNC, keep NPO x2 hours then trial PO if clinically improved
- RN of MD to observe first feed
- Use extra caution in neonates <90 days old

Move to Inpatient Bronchiolitis Management and HFNC Weaning Guidelines

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2. Resources

3. Links

4. Supplemental Links

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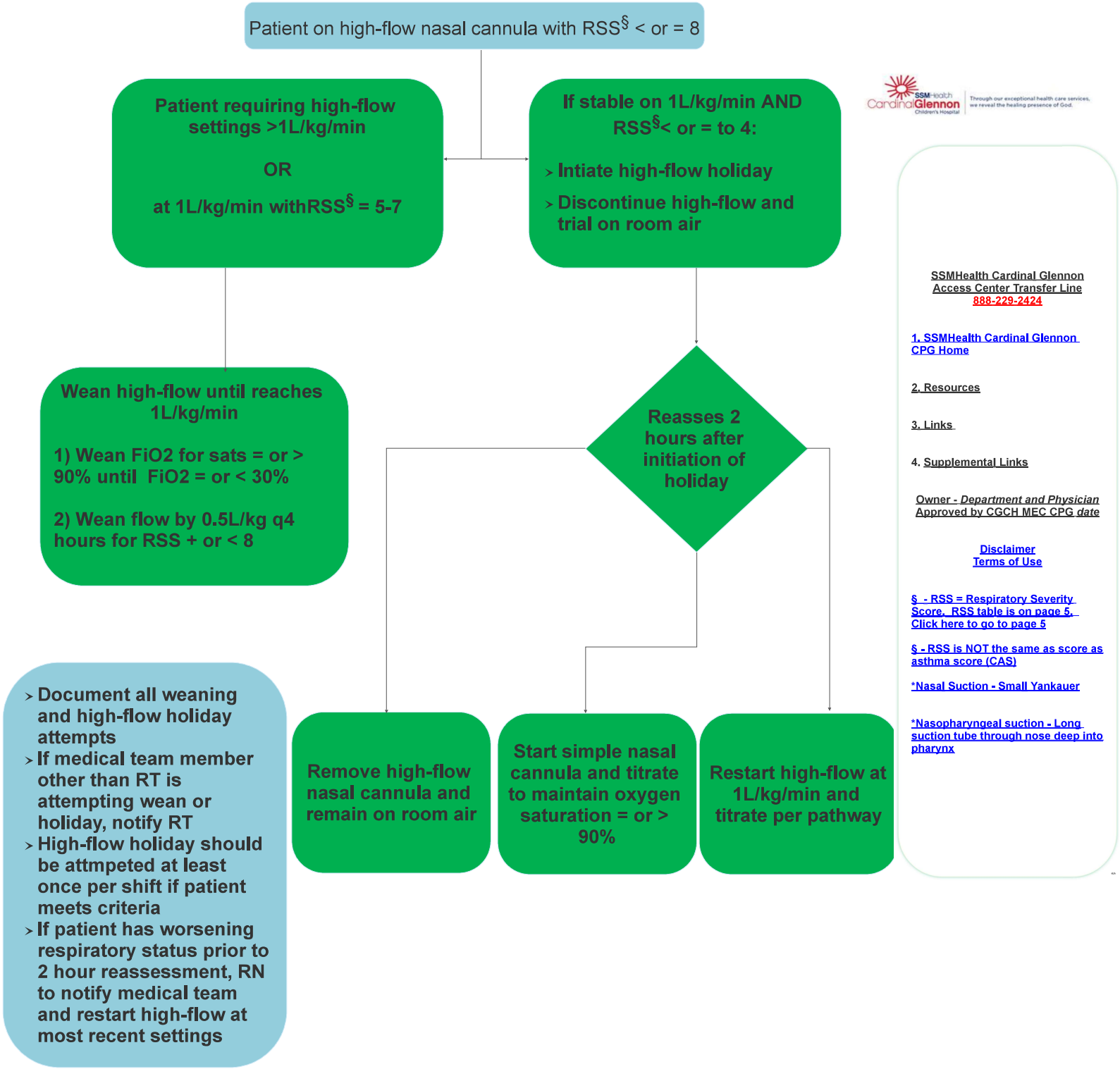
Inpatient Bronchiolitis Management: High-Flow Weaning/Holiday



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Introduction

Definition
This pathway should be used for healthy patients aged 30 days to 23 months admitted with a clinical presentation consistent with the diagnosis of bronchiolitis. Older children may present with similar symptoms, but this population may overlap with asthma and may require an individualized approach.

Symptoms
Bronchiolitis is typically diagnosed clinically, and often presents with symptoms of a viral respiratory infection (rhinorrhea, congestion, cough) in an infant, which progresses to lower respiratory involvement (increased work of breathing, tachypnea, wheezing, rales). Other symptoms may include fever, poor feeding, dehydration, fussiness, and fatigue.

Findings suggestive of another diagnosis
- No upper respiratory symptoms (rhinorrhea, nasal congestion)
- Child > 12 months with history of recurrent wheezing and bronchodilator or corticosteroid use
- Fever late in the course of illness and toxic appearance
- Paroxysmal coughing spells, prolonged cough, or apnea, especially in the setting of a known pertussis exposure

Goals of Bronchiolitis Pathway
- Encourage clinical diagnosis of bronchiolitis and optimize high-value care
    - Decrease utilization of chest X-ray, viral testing, albuterol use, continuous oxygen monitoring, antibiotic use, steroid use
- Improve patient outcomes by utilizing evidence-based best practices and decreasing variability in care
    - Decrease hospital length of stay, readmission rate
- Improve parental/family satisfaction through comprehensive patient- and family-focused care

Inclusion/Exclusion Criteria for Bronchiolitis Clinical Pathway

Inclusion criteria:
- Patients aged 30 days to 23 months who are hospitalized with clinical symptoms consistent with bronchiolitis

Exclusion criteria:
- Patients will not be eligible to be placed on the bronchiolitis pathway if they have any of the following:
    - Patients born at < 32 weeks gestational age
    - Hemodynamically significant cardiac disease requiring cardiac medications (i.e.., furosemide, beta blockers)
        - Not specifically excluded: patients with minor cardiac abnormalities (i.e., small ASD or VSD, mild pulmonic stenosis), patients with fully repaired congenital

cardiac disease who have normal cardiopulmonary circulation (i.e., fully repaired Tetralogy of Fallot)
- Chronic lung disease (bronchopulmonary dysplasia) on home oxygen and/or diuretics
- Significant neuromuscular disease requiring assistance with breathing or feeding (i.e., patients with spinal muscular atrophy, myasthenia gravis, significant cerebral palsy, or genetic conditions that impact ability to clear secretions)
- Any home supplemental oxygen requirement or airway clearance support at baseline

Respiratory Severity Scoring Tool

CG Respiratory Severity Scoring (RSS) Tool

		0 points	1 point	2 points	3 points
Respiratory Rate	< 2 months	< 50	50-59	60-69	> 70
	2-12 months	< 40	40-49	50-59	> 60
	13-23 months	< 30	30-39	40-49	> 50
Retractions		None	Subcostal or intercostal	*2 of the following*: subcostal, intercostal, substernal, suprasternal, supraclavicular, OR nasal flaring/head bobbing	*3 of the following:* subcostal, intercostal, substernal, suprasternal, supraclavicular, OR nasal flaring/head bobbing
Dyspnea		Normal feeding, vocalizations, and activity	*1 of the following*: difficulty feeding, decreased vocalization, or agitated	*2 of the following*: difficulty feeding, decreased vocalization, or agitated	Stops feeding, no vocalization, or drowsy and confused
Auscultation		Clear	Scattered crackles/rhonchi/ end-expiratory wheezing	Diffuse crackles/rhonchi/ expiratory wheezing *(with diminished breath sounds)*	Little to no audible air movement

How to use

- The respiratory severity scoring tool consists of 4 elements that make up the respiratory assessment of the patient in distress
- Each component is assessed distinctly and added to make a total between 0-12
- Patients should be scored, suctioned, then re-scored to determine improvement of intervention
- All RSS should be documented in electronic medical record

- The Cardinal Glennon Respiratory Severity Scoring tool was adapted from Seattle Children's respiratory scoring tool, which was adapted from the Seattle Children's asthma pathway. Interrater reliability was validated.
- Other scoring tools have been validated, but no single tool has been universally adopted or has clearly superior performance in bronchiolitis.

Inpatient Management:

Admission Placement

Once the decision has been made to admit (via the Emergency Dept. or Access Center as a Direct Admission), the following criteria should be used in deciding between admission to the General Medicine service vs. the Intensive Care Unit:

- Admit to General Medicine service -- patients with any 1 of the following:
  - Sustained hypoxemia (SpO2 <90% awake, <88% asleep) requiring supplemental oxygen
  - Physical or laboratory evidence of dehydration OR impaired oral hydration requiring IV or NG fluids
  - HFNC trial started, and showed no change OR improvement
  - Moderate to severe respiratory distress AND one of the above criteria

- Admit to Intensive Care Unit -- patients with any 1 of the following:
  - Clinical worsening despite HFNC support of 2 Liters/kg/minute (max floor support)
  - Requiring > 50% FiO2 to maintain goal oxygen saturations (SpO2 ≥ 90%)
  - Other late findings of respiratory failure
    - Inappropriately low respiratory rate
    - Lethargy
    - Poor perfusion despite adequate fluid resuscitation
    - Significant hypercarbia on blood gas
  - Apnea for >20 seconds with associated bradycardia or desaturation requiring frequent intervention

Inpatient Management:

Overall Care on Bronchiolitis Clinical Pathway

Patients meeting the inclusion and exclusion criteria should be admitted on the Bronchiolitis Clinical Pathway. Patients not meeting these criteria can be managed similarly, but should not be placed on the standardized care pathway as their care may require a more individualized approach.

- Follow the Bronchiolitis Pathway: Inpatient Management flowchart
    - Patient assessed and assigned a respiratory severity score (RSS) to determine initial vital sign and suctioning frequency
        - Patient should be assigned an initial score, have suction performed, and then be assigned a post-suction score if respiratory status has changed significantly following suctioning (score - suction - score)
            - If agitated due to suctioning, wait several minutes to re-score
    - RSS is low (1-4)
        - Score minimum q4 hours
        - Suction minimum q4 hours
            - Prior to feeds or more if distressed
            - Score should be performed after suctioning
        - Vital sign frequency: q8 hours
        - Nasal suction should be utilized instead of nasopharyngeal suctioning
        - Spot check pulse oximetry; continuous pulse oximetry only if on supplemental oxygen or other clinical concerns
    - RSS is moderate (5-8)
        - Score minimum q4 hours
        - Suction minimum of q2-4 hours
            - Score should be performed after suctioning
        - Vital sign frequency: q8 hours
        - Nasal suction
        - Nasopharyngeal suction if clinically indicated for work of breathing after nasal suctioning
        - Spot check pulse oximetry; continuous pulse oximetry only if on supplemental oxygen or other clinical concerns
    - RSS is high (9-12)
        - Score minimum q1 hours (can be alternated between RT/RN)
        - Suction minimum q2 hours
            - Score should be performed after suctioning
        - Vital sign frequency: q4 hours
        - Nasal suction
        - Nasopharyngeal suction if clinically indicated for work of breathing after nasal suctioning
        - Continuous pulse oximetry
        - Consider HFNC trial and review suggestions for escalation of care (see **Escalation for Worsening Patients** section)

- Throughout hospitalization, the patient should be re-scored based on the specified interval of the most recent RSS and re-categorized as appropriate
- Once the patient has shown clinical improvement with respiratory severity scores of ≤ 4 for at least 8 hours, discharge criteria should be reviewed (see **Discharge Criteria** section)
- Family education should begin on admission and continue throughout hospitalization (see **Caregiver and Family Education** section)

Escalation for Worsening Patients

Due to the natural course of illness, some patients may show clinical worsening prior to improvement (typical peak of illness around days 3-5 of illness) and warrant escalation of care.

- A patient with a worsening RSS or a RSS that is high (9-12) should have frequent assessments with rigorous supportive care, including frequent suctioning, consideration of fluid bolus and/or antipyretics/pain management medication
- Additional indicated therapies include:
    - Albuterol trial for patients with history suggestive of possible asthma (> 12 months age, wheezing, and one of the following: personal history of atopy or recurrent wheezing OR strong family history of atopy or asthma)
    - Initiation of high-flow nasal cannula (HFNC) is indicated for patients with RSS ≥ 9 OR a score of 3 in the "Retractions" category of the RSS despite rigorous supportive care

Criteria for Transfer to PICU

For patients admitted to the General Medicine service who are on maximal Floor support and continue showing signs of clinical worsening as detailed below:

- Transfer to Intensive Care Unit -- patients meeting any of the following criteria:
    - Clinical worsening or severe symptoms requiring HFNC flow rate > 2 Liters/kg/minute (max floor support)
    - Requiring > 50% FiO2 to maintain goal oxygen saturations (SpO2 ≥ 90%)
    - Other late findings of respiratory failure
        - Inappropriately low respiratory rate
        - Lethargy or altered mental status
        - Poor perfusion despite adequate fluid resuscitation
        - Significant hypercarbia on blood gas
    - Apnea for >20 seconds with associated bradycardia or desaturation requiring frequent intervention

Initiation and Management of High-Flow Nasal Cannula (HFNC)

High-flow nasal cannula, also called high-humidity nasal cannula and high-flow, provides heated, humidified oxygen at a higher flow of air or oxygen than nasal cannula. Oxygen is delivered with a

blender so FiO2 can be adjusted (21-100%), although actual delivered FiO2 does not reach 100%. By contrast, nasal cannula oxygen is not humidified and dries airways at higher flow rates. Proposed mechanisms of HFNC in bronchiolitis include providing CO2 "washout" of respiratory physiologic dead space, providing low-level positive pressure to aid lung recruitment, and keeping secretions moist, improving mucociliary clearance.

- Pre-HFNC Care
  - At least three rounds of suctioning should be performed to assess for improvement
  - Consider giving fluid bolus
  - Antipyretic administered if febrile
  - If RSS ≥ 9 following rigorous supportive care, proceed with initiation of HFNC
  - HFNC may also be initiated at medical team discretion for other clinical concerns

- Initiation of HFNC
  - Recommended initiation of HFNC at 1L/kg/min, FiO2 21%
    - Titrate FiO2 to maintain SpO2 ≥ 90%; max floor FiO2 is 50%
  - Huddle of medical team, including RT, RN, and MD/DO/NP, should occur at least 60 minutes after HFNC initiation
    - RSS should be documented at the time of each huddle

- Titration of HFNC
  - If no improvement, flow may be increased as needed up to 2L/kg/min (maximum floor flow rate)
    - Repeat huddle at least 60 minutes after increase to 2L/kg flow rate
    - If requiring escalation up to 2L/kg/min of flow, patient should be made NPO until clinical improvement is seen
      - Consider rapid response and PICU assessment if no improvement is seen after maximum floor settings of HFNC (2L/kg, FiO2 ≤ 50%)
      - Suctioning and vital signs should be performed and documented every 30 minutes until improvement is seen or transfer to PICU complete
  - If clinical improvement is seen after HFNC initiation (RSS < 9), patient should be assessed at least every 4 hours to assess for readiness to wean
  - While on HFNC, suction should be performed at least q2 hours and vital signs/assessment with RSS should be performed q4 hours
  - Once patient has been stable on current settings for 4 hours with RSS <8, weaning of HFNC settings should be considered (See **High-Flow Weaning/Holiday Guidelines**)

- Feeding while on HFNC
  - Following initiation of HFNC, patients should be kept NPO for at least 2 hours to ensure stability and clinical improvement prior to initiation of oral feeds
  - Once stable on settings for 2 hours, PO trial can occur and should be observed by RN or MD
    - Extra caution should be used in neonates <90 days

High-Flow Nasal Cannula Weaning/Holiday Guidelines

- Once patient has been stable and/or shown clinical improvement (RSS ≤ 8) on current settings for at least 4 hours, weaning of HFNC settings and/or a high-flow holiday should be considered
    - Patients on HFNC should be assessed q4 hours for readiness to wean
    - Weaning of HFNC
        - FiO2 should be weaned for oxygen saturations ≥ 90% until reaches FiO2 ≤ 30%
            - FiO2 typically should be weaned prior to flow
        - For patients requiring high-flow settings >1L/kg/min, flow should be weaned by 0.5L/kg/min q4 hours until reaches 1L/kg/min
        - HFNC can be weaned more rapidly as tolerated based on RT/medical team discretion
    - High-flow holiday
        - For patients who are stable on 1L/kg/min with FiO2 ≤ 30% AND RSS ≤ 4, a high-flow holiday (turn off high-flow and trial on room air) should be initiated
            - High-flow holiday should be attempted at least once per shift if the patient meets criteria
            - Immediately following HF holiday, monitor at bedside for 5-15 minutes
        - Patient should be reassessed including repeat respiratory severity scoring 60 minutes after initiation of high-flow holiday:
            - If RSS ≤ 6, high-flow nasal cannula should be removed and patient should remain in room air
            - If RSS ≤ 6 but SpO2 is sustained <90% for 5 minutes, simple nasal cannula should be started and titrated to maintain oxygen saturations ≥ 90%
            - If RSS >6, HFNC should be restarted at 1L/kg/min and titrated per pathway
        - If patient has worsening respiratory status prior to 1 hour reassessment, RN or RT should notify the medical team and restart HFNC at most recent settings prior to holiday
    - All weaning and high-flow holiday attempts should be documented in the medical record
    - If any medical team member other than RT is attempting HFNC wean or holiday, RT must be notified (in addition to documentation)

Supplemental Oxygen Management

Some children may have transient desaturations due to their viral illness, but evidence has shown that these transient desaturations are not clinically significant and should not be treated with supplemental oxygen. Accuracy of pulse oximetry is poor, especially in the 76-90% range, and transient desaturations are common in healthy infants. Supplemental oxygen should be provided if SpO2 remains persistently below 90% for ≥ 5 minutes despite other interventions, such as suctioning and repositioning.

- Supplemental oxygen for treatment of hypoxemia should be supplied via nasal cannula (or simple face mask if nasal cannula is not tolerated), using the lowest flow possible to maintain SpO2 ≥ 90%
- SpO2 drops to 88% are acceptable during sleep and should not lead to escalation of care
- Continuous pulse oximetry should be used in patients who are requiring supplemental oxygen (via simple nasal cannula or high-flow nasal cannula), and should be transitioned to spot check once the patient has been weaned to room air to prevent intervention for non-clinically significant desaturations
- Patients requiring low-flow supplemental oxygen should only receive the minimum support needed to maintain adequate oxygen saturations
- Supplemental oxygen weaning should be trialed with each assessment for SpO2 > 93%, with all weaning attempts and desaturations documented in the electronic medical record

Management of Dehydration

Clinicians should administer nasogastric or intravenous fluids for infants with a diagnosis of bronchiolitis who have clinical findings of dehydration and/or cannot maintain hydration orally. If appropriate, caregivers should be involved in the decision of how to hydrate their child. No strong evidence exists to guide feeding practices on high-flow nasal cannula.

- Infants with mild respiratory distress may require only observation, particularly if feeding and urine output remains adequate
- For infants showing clinical signs of dehydration, the level of respiratory distress should determine indications for NG vs IV hydration as increasing respiratory distress may increase the risk of aspiration
    - Oral feeding should be discontinued if it is associated with increased coughing, choking, gagging, or worsening tachypnea; patient should be made NPO with IV/NG feeds started
    - Patients with sustained respiratory rate > 60 should be evaluated for safety of a feeding trial with first oral feed supervised by RN, SLP/OT, or provider
    - Patients requiring HFNC with ongoing severe or worsening respiratory distress and escalation of respiratory support to maximum floor rates (2L/kg/min, FiO2 50%) should be made NPO with initiation of IVF
    - Patients being started on HFNC should be made NPO for at least 2 hours following initiation of HFNC, then PO may be trialed as appropriate if respiratory distress has improved
    - For patient deemed not safe to feed orally for > 2 days, NG should be placed with initiation of enteral nutrition
- Patients who not may be eligible for NG hydration include those with:
    - Significant emesis
    - Craniofacial abnormalities which would make placing an NG difficult

- Severe dehydration and concern for shock
- Other: PIV already in place and/or PIV required for IV antibiotic administration

Discharge Criteria

Use the following criteria to guide decision-making in determining patient readiness for discharge:

- Patients should meet **ALL** of the following criteria for discharge:
  - Respiratory score of ≤ 4 for 8 hours
  - No need for nasopharyngeal suction for at least 8 hours
  - Not requiring respiratory support or supplemental O2 for > 6 hours
  - Feeding adequately
  - Family education has been completed
  - Family understands follow-up plan and has pediatrician identified

Caregiver and Family Education

Caregiver education has been shown to have a significant impact on post-discharge care provided by families/caregivers for children with bronchiolitis. Teaching will be provided by the medical care team starting at the time of admission and will continue throughout the hospitalization until the time of discharge. Specific return precautions and supportive care measures should be reviewed again with families/caregivers at the time of discharge. Avoid medical jargon when providing caregiver/family education.

Recommended topics of discussion

- Signs of respiratory distress
  - When to call PCP, to go to ED, to call 911
- How and when to nasally suction
  - Using bulb suction or mouth-operated nasal aspirator
- Maintaining hydration and signs of dehydration
- Anticipatory guidance
  - Congestion lasting 2-3 weeks, cough lasting 4-6 weeks
  - Avoidance of over-the-counter cough/cold medications
  - Home pulse oximeters are not routinely recommended due to inaccuracy
  - Spread of infection and importance of good hand hygiene
  - Exclusive breastfeeding should be encouraged for at least the first 6 months of life to decrease the morbidity of respiratory infections
  - Counseling on exposure to environmental tobacco smoke and smoking cessation

Prevention

RSV, as well as many other viruses, can survive on fomites for hours and has been identified in the air up to 22 feet from the patient's bed. Due to risk of infectious spread, infection prevention will be modeled by all medical care team members throughout hospitalization, with prevention and education to be reviewed with family/caregivers prior to discharge.

- Viral isolation is standard for patients hospitalized with bronchiolitis at Cardinal Glennon, regardless of the results of any viral testing that may have been done
    - Contact/droplet precautions (mask, gown, gloves) should be utilized for all bronchiolitis patients
    - Airborne precautions (N-95 and eye protection) should be used in all patients with/under investigation for acute COVID-19 infection
    - Strict handwashing with soap/water or alcohol-based hand gel should be used before and after each patient contact, as well as after contact with objects near the patient, and after glove removal
- RSV monoclonal antibody (i.e., monthly Synagis) should be considered for at-risk infants
- Family education on hand hygiene should be completed prior to discharge

Not Routinely Indicated

The following are not routinely indicated in the care of patients with bronchiolitis, and should not routinely be used.

Therapies

Albuterol	Studies have NOT demonstrated a consistent benefit for albuterol treatment in typical bronchiolitis. An albuterol trial may be considered in children with features suggestive of possible asthma (age > 12 months, recurrent wheezing, personal history of atopy, or strong family history of asthma/atopy). Albuterol should not be continued if the patient does not respond to the trial.
Antibiotics	Antibiotics should NOT be prescribed without evidence or strong concern for a bacterial infection. Bacterial superinfections are uncommon in this age group.
Chest physiotherapy	Multiple randomized trials found no clinical benefit with the use of chest physiotherapy (vibration, percussion, and passive expiratory techniques), with no reduction in the severity of disease with any chest physiotherapy techniques. Studies suggest that forced expiratory techniques do not improve the status of patients with severe disease and can lead to serious adverse events. Slow passive expiratory techniques can provide an immediate and transient relief in patients with moderate disease without impact on duration of hospitalization.
Corticosteroids	Current evidence demonstrates that treatment with corticosteroids alone does not provide significant benefit to children with bronchiolitis, and may cause prolonged viral shedding.
Head of bed elevation	Head of bed elevation may increase lung volume in mechanically ventilated patients; however, no current evidence indicates that it improves outcomes in non-intubated patients. Head of bed elevation leads to increased risk of infants sliding into a position that can compromise safe breathing, and the risk is thought to outweigh any potential benefit.
Nebulized hypertonic	Current research does not support a role for routine use of hypertonic saline in the inpatient unit when expected length of stay is less than three days. Hypertonic

saline	saline trial could be considered in patients with prolonged hospitalization or those with severe symptoms not showing improvement over the first 48 hours of admission.
Racemic Epinephrine	Current studies have not demonstrated a consistent benefit for nebulized epinephrine treatment in typical bronchiolitis, and it should not routinely be used in treatment except potentially as a rescue agent in severe disease.

Further Diagnostic Testing

Chest X-ray	X-rays are NOT routinely recommended. Consider obtaining CXR if: • Clinical picture is not consistent with typical bronchiolitis • Clinical course suggests superimposed bacterial pneumonia • New fever late in the disease process • Severe disease/toxic appearance with absence of upper respiratory symptoms • Concern for foreign body aspiration
Viral testing (RPP)	Viral testing is NOT routinely recommended as it does not impact treatment. Consider testing if: • The diagnosis is unclear • Prolonged fever without explanation • High local incidence of influenza or high clinical suspicion for influenza and patient would warrant treatment with antivirals • Cohorting is indicated, especially in light of COVID-19 pandemic
Pertussis PCR	Pertussis testing is NOT routinely recommended. Consider testing if: • Paroxysmal or prolonged coughing episodes • Episodes of apnea • Identified pertussis exposure